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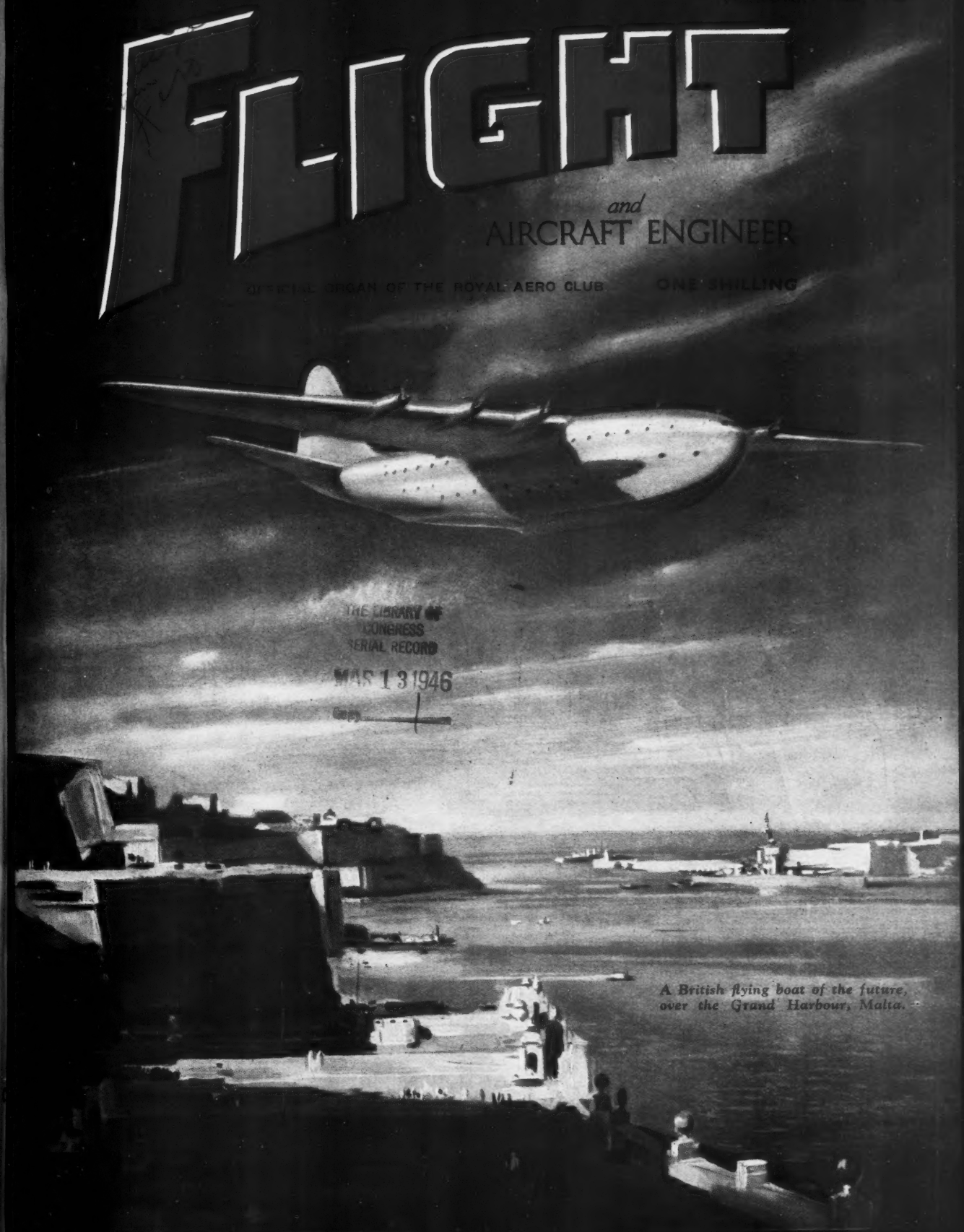

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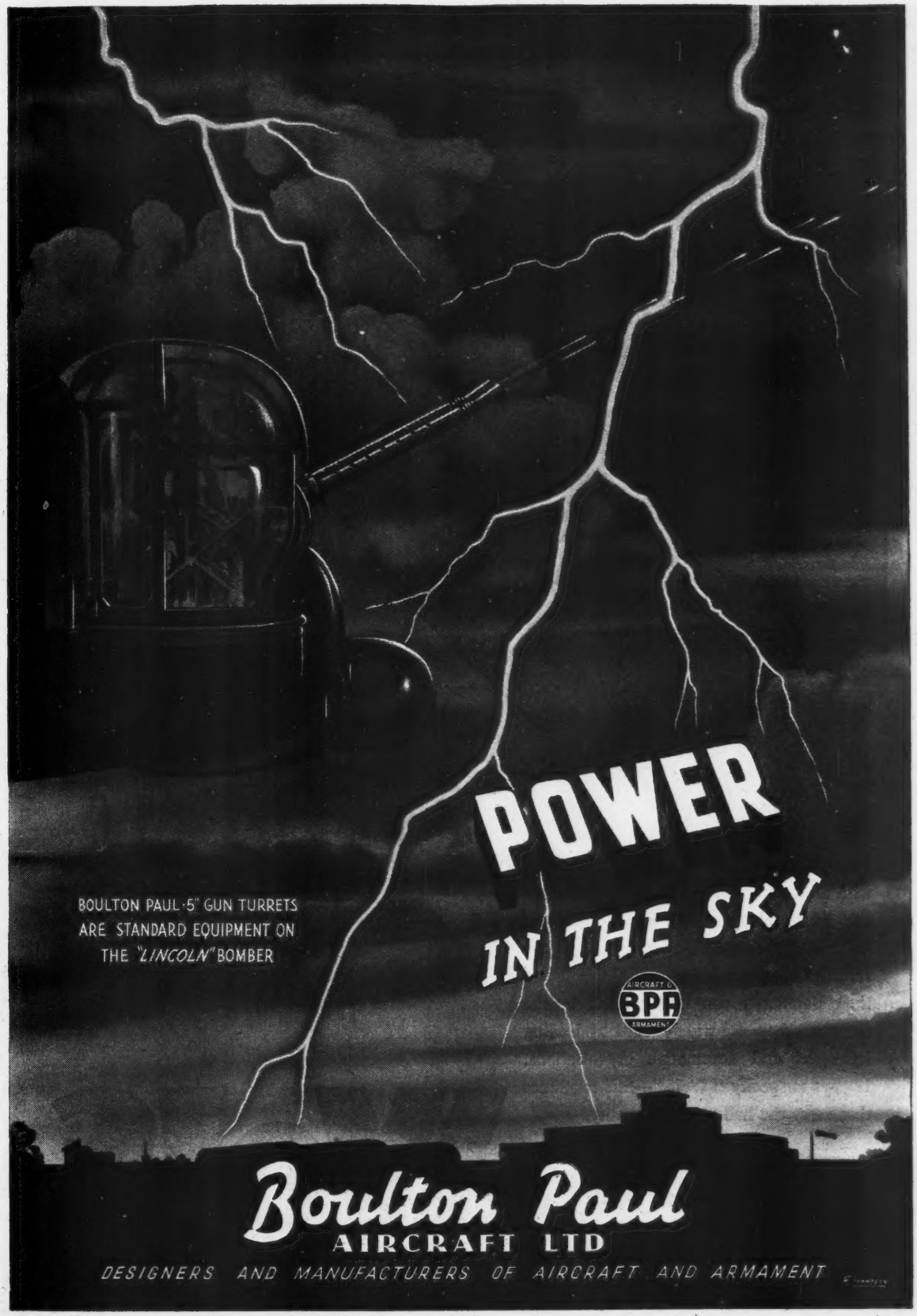
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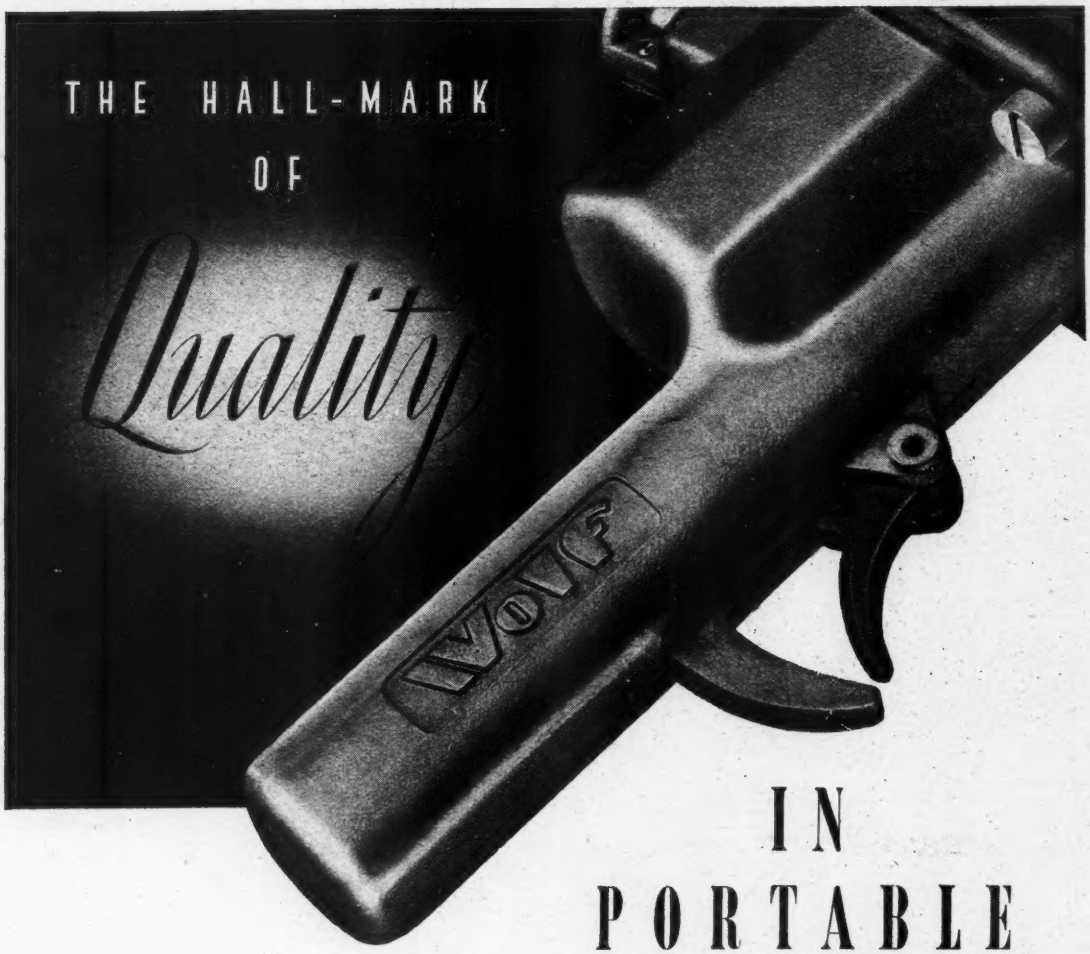

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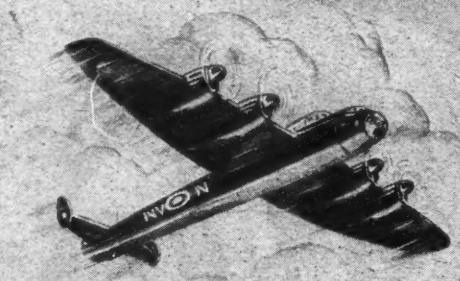

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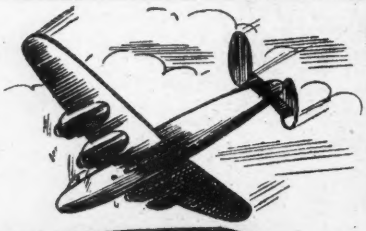

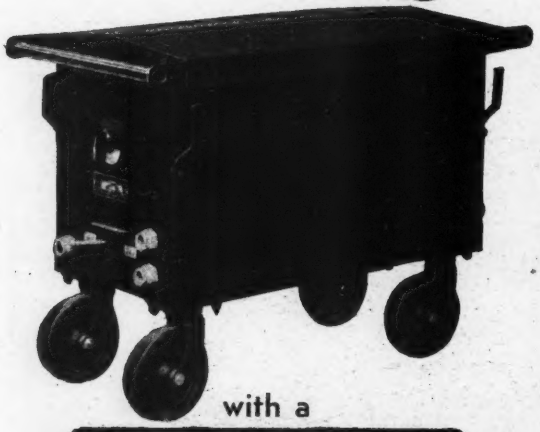

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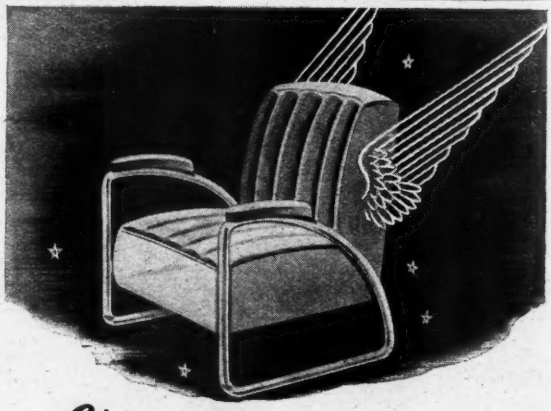

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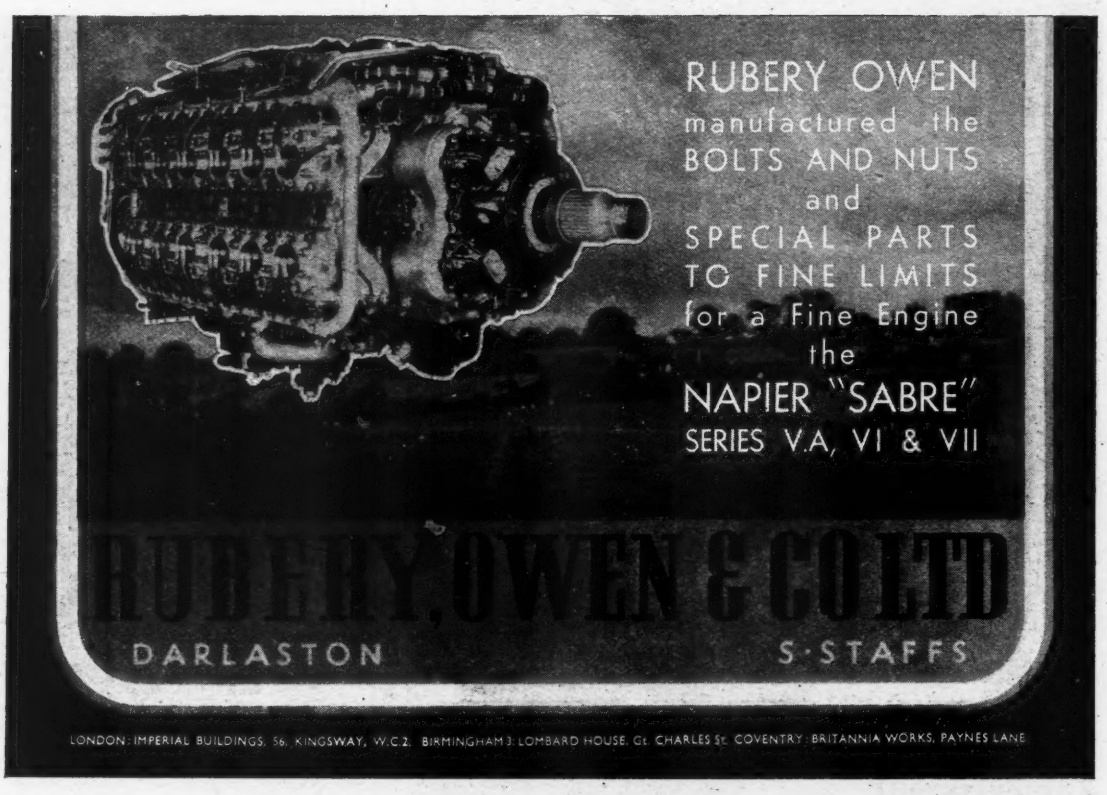

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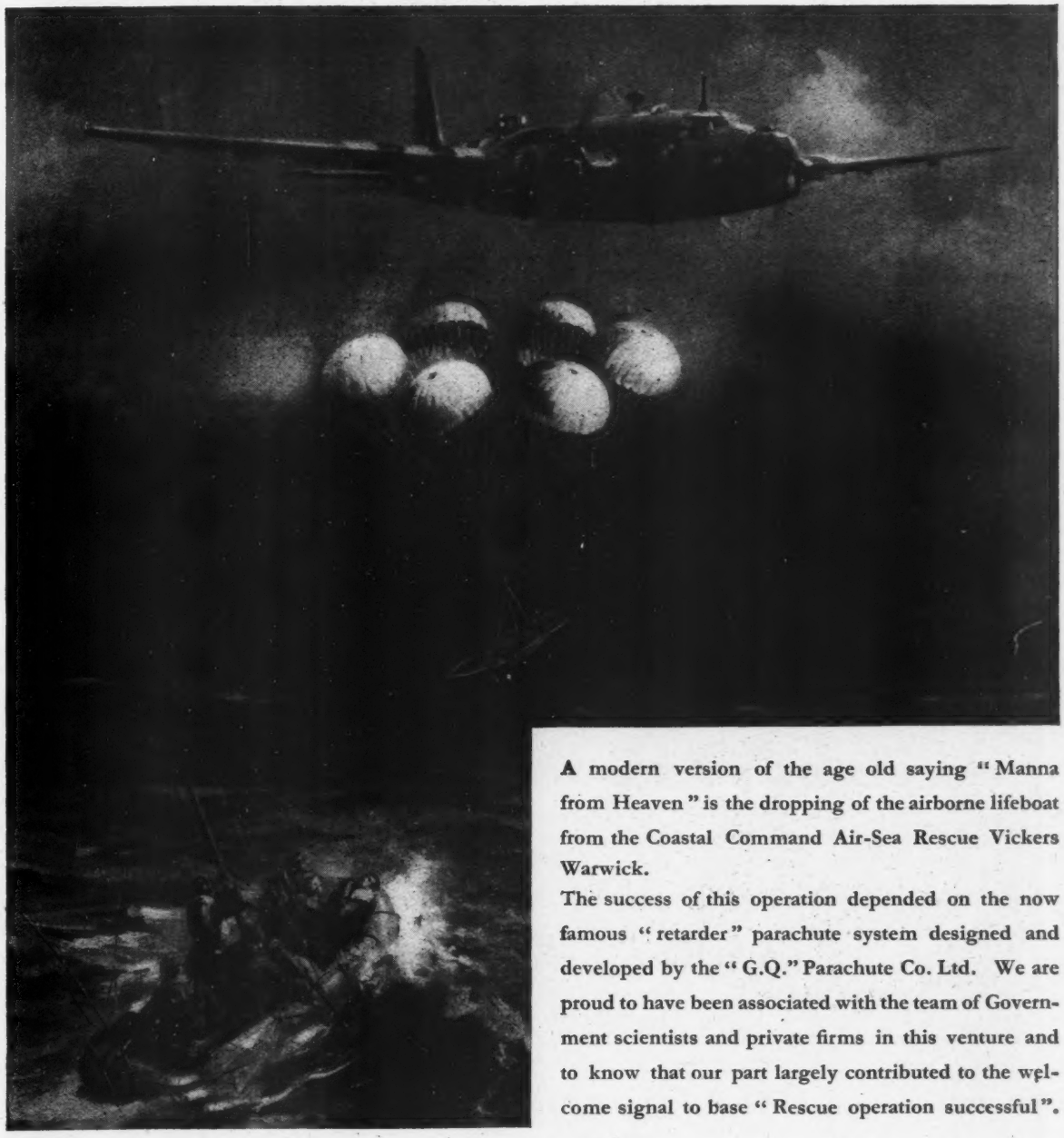

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The Outlook

Fighter Efficiency

RELEASE by the Ministry of Aircraft Production this week of data relating to the Gloster Meteor IV fighter version (the cleaned-up machine having previously raised the world's speed record to 606 m.p.h.) discloses the fact that very shortly the Royal Air Force will have the fastest Service aircraft in the world. Carrying its full service equipment, but not loaded to its full permitted weight, the machine does 585 m.p.h. at ground level and climbs to 30,000ft. in five minutes. The static thrust from the two Rolls-Royce Derwent V units is 7,000lb. If this is approximately maintained at the top speed, it represents 10,920 thrust horsepower.

So accustomed have we become to these spectacular figures that such performance is now almost taken for granted. But it must be admitted that it is still being achieved largely by brute force. Comparisons between jets and piston engines are always difficult; even more difficult are comparisons between aircraft fitted with such power units.

To obtain a better perspective it is, however, not uninteresting to ask oneself how much advance in airframe aerodynamic design is represented by these very high performances. A fortnight ago we described the Hawker Sea Fury, a type which hails from the same group as the Gloster Meteor IV. The weights of the two types do not differ very much, 12,000lb. for the Sea Fury and 12,580lb. mean weight for the Meteor. The former has a wing area of 280sq. ft., the latter 374sq. ft. Corresponding wing loadings are 43 and 33lb. per sq. ft. respectively, using as a basis for the Meteor its mean weight, which is the one for which the maximum speed is given.

The fact that, with figures so nearly similar, one machine should have a top speed of 460 m.p.h., and the other one of 585 m.p.h. is likely to cause some surprise to the uninitiated, and to create the impression that the jet-propelled aircraft must be very much "cleaner," aerodynamically, than the airscrew-driven. This is not, of course, the case. The speed of the Meteor is due to the fact that the thrust remains sensibly constant at speed (for a given height), whereas with an airscrew-driven aircraft the thrust drops off with speed. In the case of the Sea Fury it is probably between 1,500 and 1,600lb. at 460 m.p.h., compared with the 7,000lb. thrust available to the Meteor at 585 m.p.h.

In other respects the Sea Fury can be said to score. Its climb is not so very inferior to that of the Meteor, 30,000ft. in eight minutes as against five minutes. On climb, that is to say at relatively low forward speeds, the airscrew scores, and actually the static thrust of the Sea Fury's airscrew is probably not very far short of that of the two jet units in the Meteor.

Although of merely academic interest, since it could not be achieved in practice, it is somewhat illuminating to reflect that if the drag of the Sea Fury (say, 1,500lb. at 460 m.p.h.) could be assumed to vary as the square of the speed, it would only be some 2,500lb. at 585 m.p.h. compared with approximately 7,000lb. for the Meteor IV.

The American Records

HITHERTO, but little information has been available concerning the two records established by American aircraft on which we commented recently; the world's non-stop long-distance record by a B-29, and the American coast-to-coast record by a Shooting Star jet-propelled aircraft.

The former, it may be recollected, was from Guam to Washington, D.C., a distance of 8,198 miles in 35 hours 5 minutes, at an average speed of 234 m.p.h. The machine carried a double crew and 11,110 American gallons of fuel, and weighed 141,000lb. at the take-off. In addition to the standard runway on Guam, 9,500ft. long, there was an extra taxi strip 780ft. long, and the

B-29 just managed it, flying at 50ft. for the first few hours.

At the time of the flight, reports were current that one of the four engines had failed. It is now explained that it was stopped deliberately after a time, due to the excessive vibration which was caused by running the four engines at only 30 per cent. of their power. The flight engineer advised the stopping of one engine and the running of the other three at 40 per cent. of their power. This saved fuel and reduced the vibration. For a heavily loaded, not to say overloaded, aircraft such as the Superfortress was during the earlier part of its flight, it was no mean achievement to average a fuel consumption of 1.3 American gallons (approximately one Imperial gallon) for the whole flight of 8,000 miles.

Of the flight by the Shooting Star no fuel consumption figures are yet available, but an American correspondent states in a letter published in this issue that westerly winds averaging some 150 miles per hour were blowing during the flight. This would represent an average cruising airspeed of about 435 miles per hour, which appears somewhat high for maximum economy. The strong following wind still does not explain how the machine was able to fly for 4¼ hours at what must have been a fairly wide throttle opening.

Export

THE British aircraft industry in general, and the de Havilland concerns in particular, are to be warmly congratulated on completing negotiations for three very large orders from the Government of Sweden: a large number of Vampire jet-propelled fighters, a separate order for a number of de Havilland Goblin jet units (a detailed illustrated description of the Goblin will be published in next week's issue), and licence to manufacture the Goblin in Sweden. Together these orders represent one of the largest overseas transactions in the history of the British aircraft industry.

What is important, even more so than the actual export value involved (which is very great), is that in this matter the Swedish Government is taking a long view, a view which indicates the faith it has in the pre-eminence of British high-performance aircraft and power units. That faith, we feel, is fully justified, and we have no fear that our good friends in Sweden will be other than fully satisfied with their choice.

There is no doubt that the Swedish authorities were influenced by the excellent record established by the Mosquito during the war, but it is also likely that the fact that airframe and power unit come from the same group of companies, and that consequently there has been the closest possible collaboration in the overall design, has played its part. This close unification of design is most desirable in jet-propelled aircraft if we are to progress beyond what Dr. Roxbee Cox once described as "orthodox aircraft with invisible airscrews."

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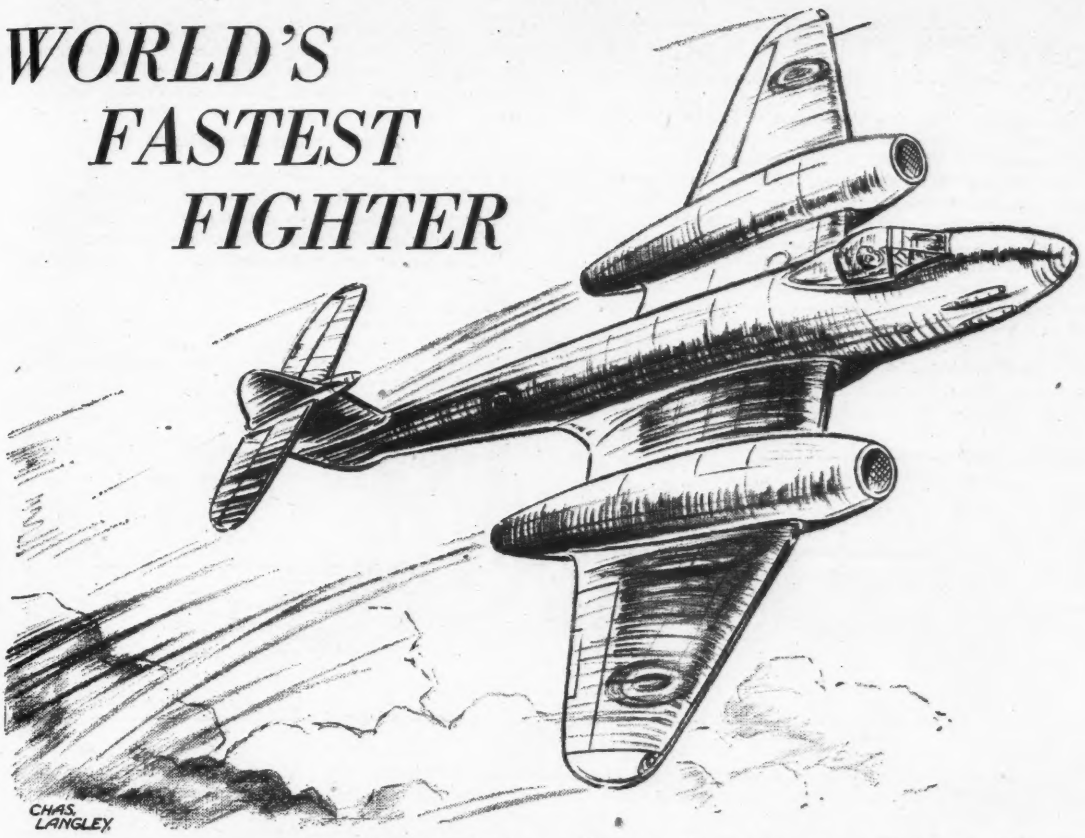
ARRAYED FOR U.N.O.: The scene on the tarmac at Handley Page's airfield at Radlett on Sunday last. Reading from the foreground the aircraft are: Vampire, Aerovan, Halifax, Viking, Lincoln, Tudor and York. The display is described on pp. 165-166.

WORLD'S FASTEST FIGHTER



Gloster Meteor IV Does 585 m.p.h. at Sea Level : Range Up to 900 Miles : Phenomenal Climb

THAT an aircraft should lose but 21 m.p.h. by carrying full military equipment as compared with one specially groomed for the world's speed record may appear astonishing. Yet that is the case of the Gloster Meteor IV, some further details of which have now been released by the Ministry of Aircraft Production. Actually the loss in speed is probably somewhat smaller than this, since the thrust from the two Rolls-Royce Derwent V engines in the Service version may be assumed to be somewhat lower than that available in the speed-record machine, the power units of which were not, however, given full throttle during the record flights.

In the Service Meteor IV the two Derwent V units give a static thrust at sea level of 3,500 lb. each. The total thrust from the two at full power gives the machine the impressive speed of 585 m.p.h. at sea level and 560 m.p.h. at 30,000ft. At the former speed, with the power units giving 7,000 lb. thrust, the equivalent thrust horse power is no less than 10,920 h.p. To obtain the same thrust from piston engines driving airscrews would require, allowing an airscrew efficiency of 80 per cent., no less than 13,650 b.h.p. The tremendous thrust available has a great effect on climb as well as on speed, as is obvious from the fact that a height of 30,000ft. is reached in the incredibly short time of five minutes. Coupled with this rate of climb is a service ceiling of 50,000ft. at the fully loaded weight of 13,900 lb. By the time some of the fuel has been consumed, and the weight has been reduced to 12,600 lb., the service ceiling has gone up to 52,000ft., which is well into the stratosphere.

By way of comparison, and to show how great is the effect of increased thrust, it will be of interest to quote a few figures for the Gloster Meteor III. Its loaded weight was 12,200 lb. and the power units gave a static sea-level thrust of 1,950 lb. each. This produced a maximum speed at sea level of 460 m.p.h. At sea level the maximum rate of climb was 4,000 ft./min., the time to 30,000ft. was 11.5 minutes, and the service ceiling just over 40,000ft. The take-off run to clear a 50ft. obstacle was 1,000 yards.

Jet propulsion is always thought to be extravagant in the matter of specific fuel consumption compared with the piston engine. A strict comparison is difficult, but it is now customary to state the specific consumption of a jet unit in pounds per hour per pound of thrust as the counterpart of the piston engine's pound per horse-power per hour.

Fuel Economy

In the official figures of the Meteor IV released by M.A.P. the ranges are given for various tankages, at an economical cruising speed of 350 m.p.h. at 30,000ft. With 275 gallons in the tanks the range at most economical cruising speed is 500 miles, which corresponds to 0.55 gallons per mile, or 1.8 miles per gallon, a figure which is not too bad when allied to a speed of 350 m.p.h. Looked at in a different way, the hourly fuel consumption is just over 190 gallons for the two units. At present the aircraft has a standard permanent tank capacity of 330 gallons but has only been cleared for a normal tankage of 275 gallons. When the R.A.F. begins to take delivery of its Meteor IVs the machine will doubtless be cleared for carrying not only its full tankage of 330 gallons (giving a cruising range of 585 miles) but also the ventral drop tank of 180 gallons for which provision has been made. The extreme range should then be extended to something like 800 miles, making an allowance for the climb to the operational height of 30,000ft.

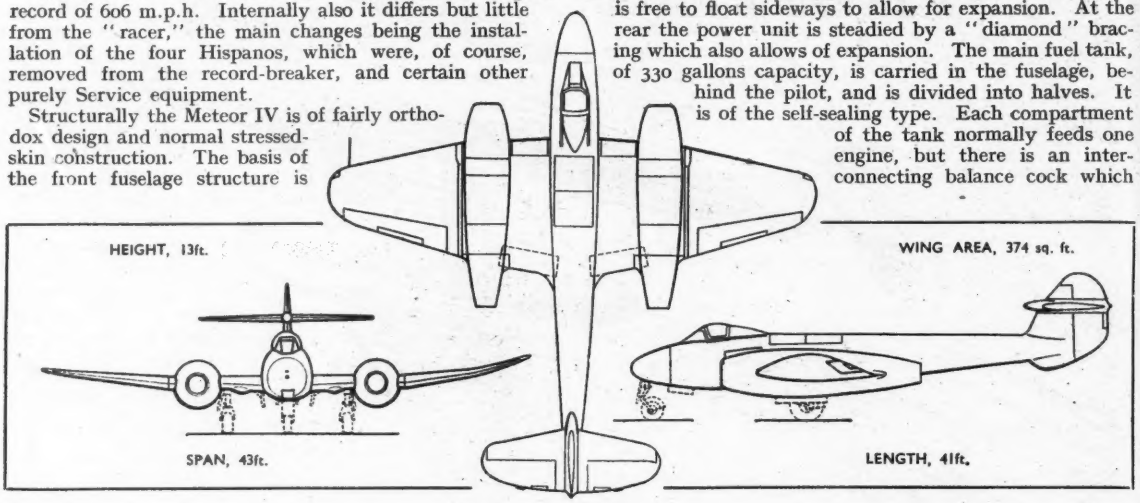
These figures indicate that when the Royal Air Force

WORLD'S FASTEST FIGHTER

has equipped a number of squadrons with the Meteor IV it will possess a weapon of outstanding performance which, with an armament of four 20 mm. belt-fed Hispano guns, will have great striking power in addition to its speed.

Externally the Service version of the Meteor IV is identical with the machine which established the world's speed record of 606 m.p.h. Internally also it differs but little from the "racer," the main changes being the installation of the four Hispanos, which were, of course, removed from the record-breaker, and certain other purely Service equipment.

Structurally the Meteor IV is of fairly orthodox design and normal stressed-skin construction. The basis of the front fuselage structure is formed by two vertical fore-and-aft diaphragms and three solid bulkheads. The front bulkhead carries the nosewheel mounting structure, and the internal structure is sealed between the nosewheel bulkhead and the seat bulkhead. On later aircraft this part will form a pressure cabin. The fuselage centre and rear portions are of semi-monocoque construction, and the two rearmost frames are extended to form posts for the lower fin. The tail unit is of stressed-skin construction. The high setting of the tailplane is necessary to get it clear of the jet streams but has the disadvantage of splitting the rudder into an upper and a lower part. Trimming tabs are fitted to each elevator "half" and to the lower portion of the rudder.



Wing Construction

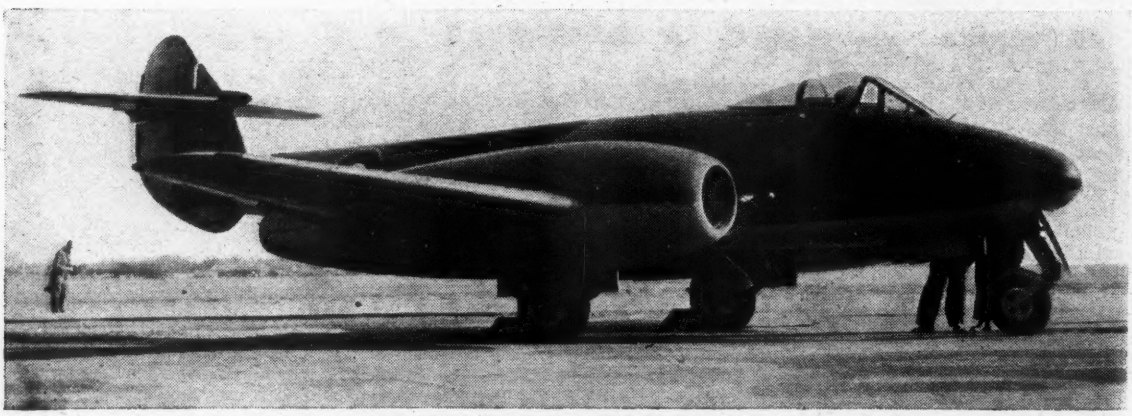
The main wing is of normal two-spar construction covered by a stress-bearing skin. It is divided into a centre section and two outer wing portions, the latter being attached just outboard of the engine nacelles. Between the sides of the fuselage and the nacelles are located the undercarriage units and the air brakes which comprise an upper and a lower member. They open "like a book." The ailerons carry internal mass balances and automatic balance tabs.

Turbine Jet Mountings

An interesting feature is the mounting of the two power units. They are located between centre-section ribs, and are carried on trunnion-type side mountings. One of which is free to float sideways to allow for expansion. At the rear the power unit is steadied by a "diamond" bracing which also allows of expansion. The main fuel tank, of 330 gallons capacity, is carried in the fuselage, behind the pilot, and is divided into halves. It is of the self-sealing type. Each compartment of the tank normally feeds one engine, but there is an interconnecting balance cock which is normally closed. Fuel is fed to the burners by electric and engine-driven pumps. Provision has been made for carrying a 180-gallon drop tank under the centre section.

Each power unit has mounted in front of it a Rotol gear box for driving auxiliaries. Each drives a vacuum pump, and in addition the starboard drives a hydraulic pump and the port an electric generator. The pneumatic system is worked from two air containers (there is no compressor) and operates the gun-cocking gear and wheel brakes. The hydraulic pump operates the undercarriage, flaps and air brakes. The electric generator is a 24-volt, 1,500-watt type and charges two 12-volt accumulators. Two-way radio is mounted in the rear fuselage, and beam-approach and I.F.F. equipment is also carried.

As already mentioned, the armament comprises four belt-fed Hispano cannon. They are fired electrically by a selective "wobble button" on the hinged spade grip of the control column. The four ammunition boxes (one for each gun) are located in a magazine bay immediately



The record breaking Meteor was a standard Mark IV with gun ports covered and all surfaces highly polished. Only two-thirds of the thrust of the Rolls-Royce Derwent Vs was used.

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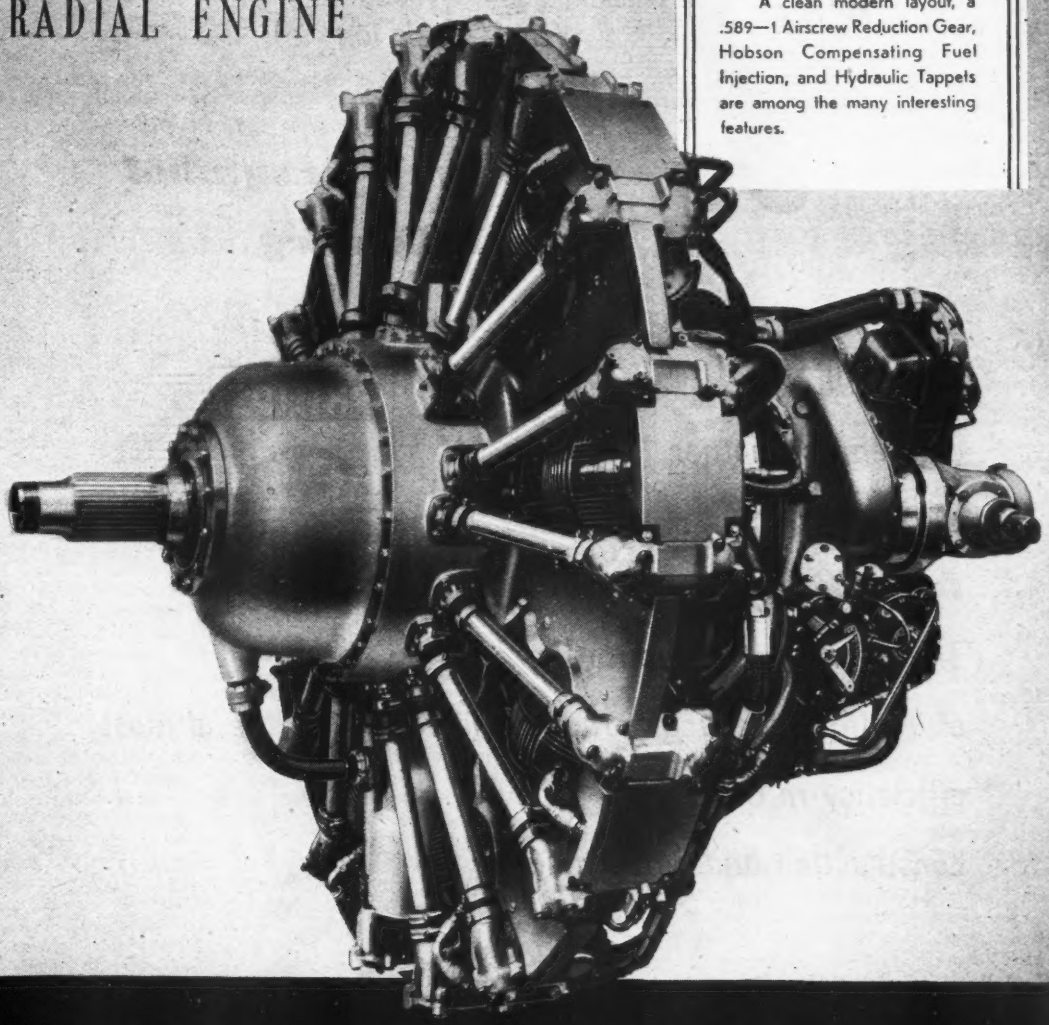
THIS latest addition to the Armstrong Siddeley range of radial engines provides 850 h.p. for a weight of 1020 lbs. and a diameter of 48½ inches.

A clean modern layout, a .589—1 Airscrew Reduction Gear, Hobson Compensating Fuel Injection, and Hydraulic Tappets are among the many interesting features.



ARMSTRONG SIDDELEY

COUGAR

ARMSTRONG SIDDELEY MOTORS LTD (BRANCH OF HAWKER SIDDELEY AIRCRAFT CO. LTD.)

The letter Eta
(the Greek long e)
is known by
engineers as the ***symbol for Efficiency***

The Philips
emblem is another
symbol
for efficiency.

The world-wide reputation
of Philips electrical products is based on the utmost efficiency in design,
construction and performance

PHILIPS

LAMPS · RADIO · X-RAY · COMMUNICATIONS EQUIPMENT
AND ALLIED ELECTRICAL PRODUCTS

PHILIPS LAMPS LTD · CENTURY HOUSE · SHAFTESBURY AVENUE · LONDON · W.C.2 (126N)

WORLD'S FASTEST FIGHTER

behind the pilot. A gun camera is mounted in the fuselage nose fairing, and the control for it is incorporated in the gun button and may be used without the guns being fired.

Other equipment to be included is a combined cabin pressurisation and heating system, a gun-heating system, de-icing and de-misting of the windscreen, and an oxygen system. Some Meteors are now being fitted with full photographic equipment and are being "tropicalised."

The tricycle undercarriage is of the Dowty levered-suspension type. The main wheels retract inwards and the nosewheel backwards. All are Dunlop. The nosewheel, when retracted, lies between the parallel-motion rudder pedals. In addition to the normal electrical indicators, there is a mechanical down-lock indicator for the nosewheel, just forward of the windscreen.

GLOSTER METEOR IV FIGHTER
Two Rolls-Royce Derwent V Jet Units
Static Thrust at Sea Level 3,500 lb.

Length o.a.	41ft.
Wing span	43ft.
Wing area	374 sq. ft.
Tare wt.	9,880 lb.
Light wt.	11,260 lb.
Maximum wt.	13,900 lb.
Mean wt.	12,580 lb.
Wing loading at max. wt.	37.2 lb./sq. ft.
Take-off over 50ft. (max. wt.)	720 yards
Landing over 50ft. (light wt.)	740 yards
Take-off speed (max. wt.)	115 m.p.h.
Landing speed (light wt.)	95 m.p.h.
Climb to 30,000ft.	5 mins.
Service ceiling (max. wt.)	50,000ft.
Service ceiling (mean wt.)	52,000ft.
Economical cruise at 30,000ft.	350 m.p.h.
Range with 275 galls.	500 miles
Range with 330 galls.	585 miles
Range with 455 galls.	820 miles

All ranges are at an operational height of 30,000ft., and allowance has been made for the fuel used in reaching that height.

Mapping the United Kingdom

Civil Use of P.R. Organisation

By MAJOR F. A. de V. ROBERTSON, V.D.

IN a recent issue (December 13th) we published a brief article on the work of the Photographic Reconnaissance Units. They have done simply great work in the war, and it would be a thousand pities if such an organisation were to be disbanded without making some contribution to the peace which we try to believe that we have accomplished.

As a matter of fact, the Ordnance Survey of the United Kingdom was in considerable need of help. Its maps, excellent at the time they were produced, are now considerably out of date. Towns, or urban areas as they are called, are always expanding as a result of normal building operations. Much was heard in the years before the second world war of ribbon development along the new arterial roads. The Ordnance Survey could not be expected to keep pace with all of this. Then came the German bombs, and the damage they did has to be made good. No authority could be expected to draw up sound plans for reconstruction without accurate charts of the extent of the devastation, especially as in certain cases (notably London) it was proposed to re-plan the layout of the area. Slums have been regarded as a national disgrace for a long time past, and where the enemy bombers have obliterated slum areas the intention is to erect buildings on the sites of demolition which shall not be a blot on our civilisation, but shall make for a healthier and happier life for the working classes. Then other amenities, from which all classes will benefit, have to be considered, such for example as providing a better view of St. Paul's Cathedral, the provision of green belts and open spaces (sometimes called the lungs of the cities), and so on.

Speed Survey

Mapping the whole country in detail is an enormous task, and when urgency is needed the country cannot afford to wait for the old-time methods of men with chains and plane-tables. Those methods served well in the past, but in the present emergency they are too slow. The obvious thing was to call in the help of the air, and the P.R. organisation is ready at hand. It has the experience and it has the equipment. The Ministry of Town and Country Planning decided to enlist its aid, at least for England. For Scotland, where there has not been much devastation through enemy action (though parts of Glasgow and Aberdeen have suffered) the problems and needs are somewhat different. They are concerned with expansion rather than reconstruction. There the Ministry of Health took charge.

A central organisation has been formed at the Air Ministry to direct the general policy of this new photographic survey. The actual work is divided between P.R. and Bomber Command. The whole of the United Kingdom is being photographed on a scale of 1/10,000. To achieve this, a line has been drawn across Great Britain, following the parallel of latitude of 50 deg. N. This runs just north of Hull and Leeds. South of this line Bomber Command takes the photographs, and north of it P.R. does the work.

The Ordnance Survey are producing mosaic maps from these photographs, prepared to a scale of 25 inches to a mile for rural areas and 50 inches to the mile for urban areas. These maps will ultimately be on sale to the public. Photographs of bombed areas are being produced on a scale of 1/5,000. These will mostly be for the use of the Ministry of Town and Country Planning, but the Ordnance Survey may also make use of them. It is reckoned that London will call for some 200 sorties, and Manchester about the same. If the weather were uniformly favourable Glasgow might be completed in about 130 sorties.

Scottish Highlands

In Scotland, as was stated above, the problem is rather different. There the Ministry of Health wants to plan for development, housing, etc. The glens concerned in the hydro-electric schemes are also being photographed. Lovers of the exquisite district of Atholl see with gloom the lines drawn on the department's maps round the glens of Tummel and Garry. For the rest, the unproductive mountain areas are being left alone, except for the 1/10,000 mosaics which will cover the whole United Kingdom. The parts where development is to take place are mostly in the Lowlands, and in the flat stretches of Lowlands; for there are many hilly districts south of the Highland line. Two stretches of country between Edinburgh and Glasgow are marked for special attention, one following the direct rail and road line from Forth to Clyde, and the other running to the south of the Pentlands and other high ground.

The advantage of these maps to local governments will be immense. Some have already shown wisdom and forethought. Glasgow, for instance, though still cursed with too many slummy areas, has for years past put great energy into what are locally called "schemes," which means little townships composed of big blocks of flats. Edinburgh, on the other hand, has shown a tendency to sprawl, as if no directing hand were guiding it.

Apart from their utility to Government departments, maps have for many people, motorists and others, a charm of their own. Even the most unemotional could scarcely escape a thrill on seeing their own house and garden on a spacious map which devotes 50 inches to a mile.

HERE AND THERE

R.A.A.F. in Japan

MELBOURNE radio, recently quoted by *Reuter*, reported that 78 Mustangs of the R.A.A.F. were leaving Labuan, off the coast of Borneo, on a 2,500-mile flight to Japan to serve with the Empire Occupation Forces.

Catalinas, Beaufighters and Dakotas making the trip at the same time would bring the total number of aircraft concerned to 121.

Allied Acknowledgment

FOUR R.A.F. officers were recently presented with the American Legion of Merit "for exceptionally meritorious service" in operations with the U.S. Navy against U-boats, by Admiral H. Kent Hewitt, U.S.N.R., Commander of U.S. Naval Forces in Europe, at the U.S. Navy Headquarters in Grosvenor Square, London. They were Air Vice-Marshal F. H. M. Maynard, Grp. Capt. E. C. Kidd, Wing Cdr. T. H. E. Edwards, and Sqn. Ldr. Eric J. Bannister.

Peacetime Quarters

NO. 13 Group of R.A.F. Fighter Command has moved from Drummossie, its wartime station near Inverness, to peacetime headquarters at Dalcross which is also in Inverness-shire, and the transfer has enabled the R.A.F. to hand back to the owners the considerable amount of property they occupied in the town of Inverness, including seven hotels.

All R.A.F. and W.A.A.F. personnel are now accommodated in service quarters on their new station.

It was chiefly with Hurricanes and Blenheims that No. 13 Group first met the *Luftwaffe* over Scotland and the shipping lanes on its eastern seaboard, and they shared the work with No. 14 Group until the latter was disbanded in July, 1943.

TWO IN HARMONY: Mr. M. J. H. Bruce (right), managing director of Cunliffe-Owen Aircraft, Ltd., smiles appreciatively as he surveys the model of the Concordia with his chief designer, Mr. W. Garrow Fisher.

New U.S. Engine

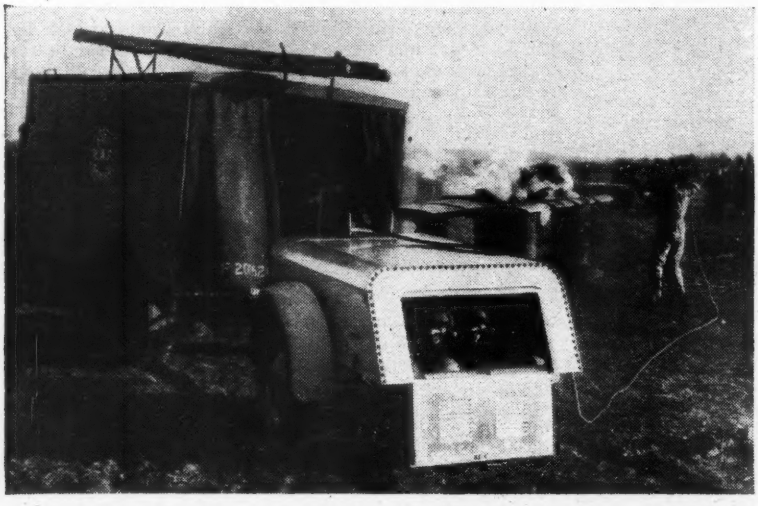
THE Chrysler Corporation of America has produced a new inverted sixteen-cylinder V-type liquid-cooled engine developing 2,500 h.p. Since it has a diameter of only 33.5in., the new engine offers possibilities of submerged wing installation.

The engine has been test flown in a modified P-47, and is reported to have met all test requirements. Specific weight of the Chrysler engine is 0.972lb./b.h.p., an excellent figure, which is exceeded, however, by some British in-line engines, notably the Sabre VII, which has the remarkably low figure of 0.83lb./b.h.p.

R.C.A.F. Surplus

A TOTAL of 988 aircraft had been disposed of by the Canadian War Assets Corporation up to the end of December last. Of these, 659 were acquired by purchasers within the Dominion and 329 were sold for use elsewhere. Types sold during December were Cessna Crane, Harvard, Norseman, Canso, Ventura, and one Cornell for educational purposes.

Receipts from the sale of aircraft, aircraft engines, and equipment to the end of the year total $4,895,202 (roughly £1,088,000).



THIS FIRE-FIGHTING TRAILER has been designed to meet an urgent Ministry of Civil Aviation need. It is intended for use on minor aircraft fires at small airfields which have only limited staffs, and it can be towed by any airfield duty car. The trailer carries six 60-lb. cylinders of CO_2 and the gas is discharged through one delivery horn.

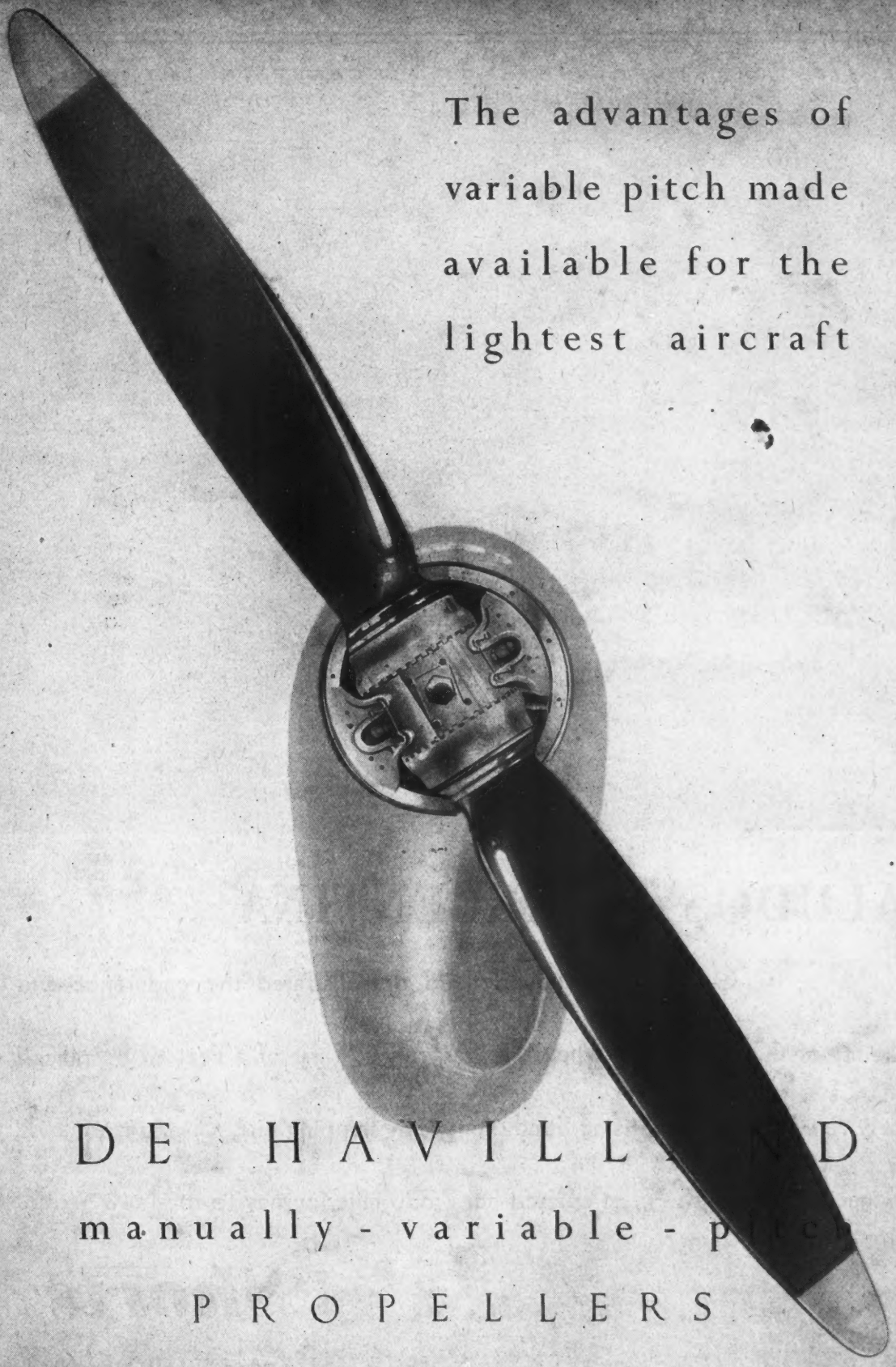
"Freedom" for Bomber Chief

OF all the town and city "Freedoms" conferred on men who, by their war service, have deserved well of their fellows, probably none is more apt than the Freedom of High Wycombe recently received by Marshal of the R.A.F., Sir Arthur Harris.

There must have been many thousands of Britons who wondered just where was the "secret" headquarters of Bomber Command from which Sir Arthur planned the paralysing R.A.F. onslaught on the "impregnable" fortress of the Third Reich (though it was, of course, an open secret to quite a few), and it probably came as a surprise to many to learn that it was as near to London as the outskirts of the borough of High Wycombe.

The casket containing the scroll was

The advantages of variable pitch made available for the lightest aircraft



DE HAVILLAND

manually - variable - pitch

PROPELLERS

THE FIRST MANUFACTURERS OF AIRCRAFT IN THE WORLD

SALUDOS AL "ARGENTINA"

Once again, a Sunderland demonstrated the endurance and reliability of the flying boat, when the "Argentina," first of a fleet to be placed in service with the enterprising South American shipping line, Cia Argentina de Navegacion Dodero, S.A., completed her 7,330 mile journey to the New World.

Shorts
(Established 1908

ENGLAND TO BRAZIL, 4,590 MILES WAS REACHED IN 25½ HOURS FLYING TIME

SHORT BROS. (ROCHESTER & BEDFORD) LTD.
SEAPLANE WORKS, ROCHESTER, KENT

SHORT & HARLAND LIMITED, QUEENS ISLAND,
BELFAST, N. IRELAND.

HERE AND THERE

made by local craftsmen, and the crests of the R.A.F. and the U.S.A.A.F. (also at High Wycombe) were made of English boxwood from a tree at Chequers.

Sir Arthur, receiving the presentation from the Mayor, Councillor C. W. Lance, fittingly referred to "the bitter sacrifices of all those in Bomber Command who made our victory possible at such inevitably high cost to themselves and at such low cost to the other Forces of the United Nations.

A Naval Occasion

ONE of the longest formation flights ever undertaken by the Naval Air Arm was completed recently when nine twin-engined Expeditors of No. 742 Squadron landed at Lee-on-Solent, having flown from Sulur, India, a distance of 6,500 miles. Lt. Cdr. T. Neville Stack, R.N.V.R., was in command.

The squadron has been operating an air transport service between Sulur, Ceylon, and Singapore for the past ten months, during which time the nine returned aircraft and their crews have piled up a total of 1,000,000 air miles.

The First Enemy

THE grim weather conditions encountered—and defeated—by the men of Coastal Command who operated from the Shetlands, Iceland and Murmansk, in support of Russian convoys during the war, were described by Air Chief Marshal Sir Philip Joubert in a talk to the Royal Geographical Society, in London, recently. He said that high altitude flying played an important part in combining with the Navy to defeat the threat of German bombing attacks, U-boats, and heavy surface vessels.

When winter gales struck the R.A.F. base in Iceland, he said, the engines of aircraft on the airfield had to be kept running while ten or fifteen men hung on to wing tips to keep the machines on the ground.

It was by no means unknown, incidentally, for small buildings to become airborne—with no take-off run!

Confidence

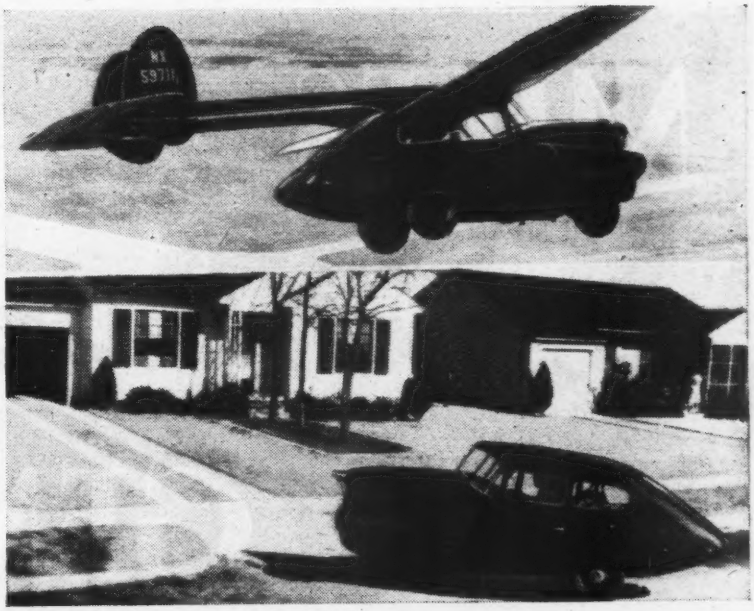
INVENTORS are noted for the complete confidence they display in their creations, but it would be difficult to imagine a more convincing demonstration of this quality than that given by Mr. Jack Banner, an experimental officer at the Admiralty during the war.

Mr. Banner, who had served for ten years in the Fleet Air Arm before joining the Admiralty's naval air radio department, submitted an invention which virtually turned a ditched pilot into a floating beacon of a kind that gave his position to our men only.

Authority, as is its wont, was a little sceptical, so Mr. Banner offered to test it himself, and baled out into the sea from 5,000ft. in bad visibility, seven aircraft having been detailed to find him.

"Fortunately," said Mr. Banner in a recent interview, "the gadget worked."

The device saved the lives of many of our airmen, and its inventor, now works manager of a new radio factory at Aberdare, was awarded the M.B.E. in the New Year Honours.



NEW ANGLE ON AN OLD IDEA: An experimental product by Southern Aircraft (U.S.) which sheds wings, tail and airscrew to become a three-wheeled motor car whose probable horse-power should startle Mr. H. F. S. Morgan!

News in Brief

HUNDREDS of bicycles used by R.A.F. pilots and aircrew to get to and from their station quarters and their aircraft are among 20,000 Service machines being exported to the Dutch.

* * *

This evening's meeting of the Glasgow branch of the R.Ae.S. is being devoted to the reading of four ten-minute papers by its own members, with discussion to follow, in the Royal Technical College, George Street. The meeting starts at 7.30 p.m.

* * *

The first Lancaster freight plane of British South American Airways, *Star Gold*, is reported, just as we go to Press, to be due at Heathrow from Natal on Wednesday, Feb. 13th, with the first cotton samples to be sent by air from Brazil. The bale measures 49in. x 18in. and weighs 150 kilos.

* * *

Marshal of the R.A.F., Lord Portal of Hungerford, is to be head of an organisation within the Ministry of Supply for the production of material for the Atomic Research and Experimental Establishment at Didcot. Professor J. B. Cockroft, director of the Canadian atomic energy branch, has been appointed director of the new Didcot establishment.

* * *

Grp. Capt. G. L. Cheshire, V.C., D.S.O., has retired from the R.A.F. (on account of medical unfitness for Air Force service), and retains his rank. His retirement is dated January 22nd.

* * *

Air Comdre. Griffith J. Powell, formerly of R.A.F. Ferry Command, has been awarded the Order of Military Merit by the Mexican Government for "great services while working in co-operation with the Mexican Forces on air bases on Mexico's Pacific coast."

Mr. E. M. Malett, formerly with the Hawker Aircraft Co., Ltd., has been appointed sales manager for aircraft finishes to Docker Bros., paint manufacturers.

* * *

Mr. Bernard V. Leak has been appointed chief designer to Folland Aircraft, Ltd., in place of Mr. Stanley H. Evans who recently resigned for health reasons and has returned to California.

* * *

Vickers Armstrongs, Ltd., are to manufacture the products of the Clearing Machine Corporation of Chicago, the sole selling arrangements of which will be handled by the Rockwell Machine Tool Co., Ltd.

* * *

Mr. John M. Jardine, who joined the de Havilland Aircraft Co., Ltd., on the business side early in the war, has been appointed general manager of the firm's Propeller Division at Stag Lane, Edgware, Middlesex.

* * *

The death is announced of Mr. F. Samuelson, for many years chief turbine engineer of the B.T.H. company and a director from 1934 until June, 1939. Mr. Samuelson, a native of Sweden, had been with B.T.H. for 44 years and retired in March, 1941.

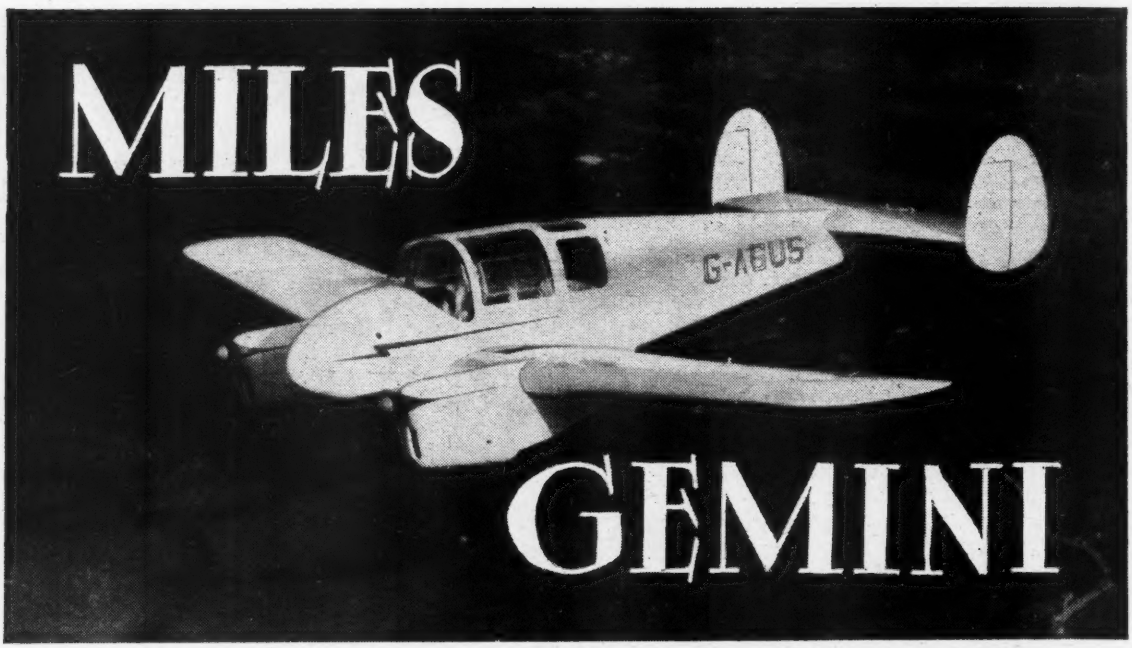
* * *

A number of readers have asked recently how they can obtain "A" or "B" pilots' licences. Any information which is required on this subject can be obtained by applying to the Licensing Department of the Ministry of Civil Aviation, Ariel House, Strand, London, W.C.2. (Telephone: Holborn 3434.)

* * *

The Chrislea Aircraft Co., Ltd., is now at Heston Airport, Hounslow, Middlesex (tel.: Hounslow 2345).

D



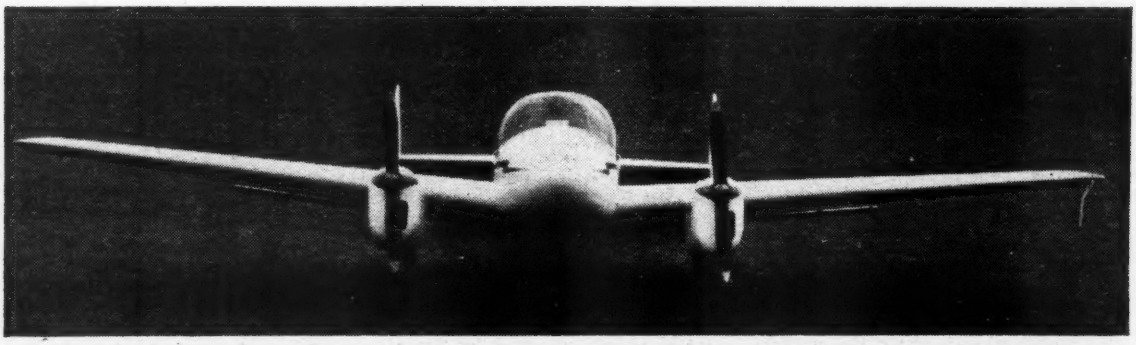
New Light Twin for Private Owner or Taxi Service : Retractable Undercarriage : Cruising at 130 m.p.h. on 200 h.p.

THE idea of laying out a private-owner or taxi aircraft in such a way that it has the advantages, in view and comfort, of larger types has always been an attractive one. Unfortunately, its success has so far tended to be limited by at least two factors: either it has been necessary to fit comparatively highly powered engines with a consequent increase in weight and size all round, or these engines have been so low-powered that many of the advantages of a twin engined installation have been lost. In short, the really good twins designed for the private owner in pre-war days were expensive both to buy and to operate and the chances of producing a really practical type of this kind at a really low price were small.

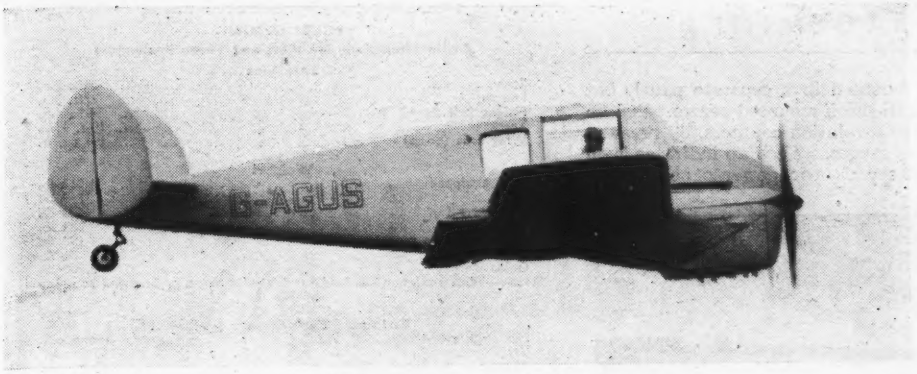
Although still very much in preliminary shape, the new Miles Gemini, with its two Cirrus Minor II engines and low structure weight, shows good possibilities of being an effective compromise in this world of small twins. The prototype has, so that it could be put in the air as soon as possible, been considerably simplified as far as the ancillaries are concerned. It has, for instance, a temporary fixed undercarriage, while the eventual production model will have an electrically operated retractable undercarriage. The Miles high-lift flaps are, in the prototype, mechanically operated through a wheel on the right side of the pilot and matching, in shape and size, the fore and aft trimming wheel on his left; in the production Gemini these will be electrically operated. To this end a neat little control panel has already been installed in the prototype with a pair of two-way interconnected switches and warning lights for the undercarriage, and a single three-way switch for the flaps. The neat "press-button" safety stop for the undercarriage selector may not, we feel, be very practical when the pilot is wearing gloves, but the idea is good.

Single-engined

A light twin loses a great deal of its value if the single-engined performance is poor or even non-existent. Apparently, and from what one can gather without practical experience, the Gemini, even with its present fixed undercarriage, performs satisfactorily at medium loads, after some slight increase of fin area, found necessary during the



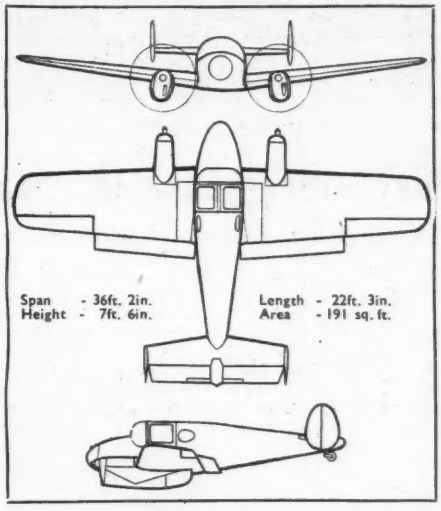
An exceptionally good forward view is the natural result of the combination of twin layout and deep unobstructed screen. This photograph emphasises the Gemini's aerodynamic cleanliness.



In prototype form the Gemini has a fixed undercarriage. This "doctored" flying view gives an idea of its ultimate appearance.

first tests, had been made to deal with low-speed control requirements. When the aircraft has been duly fitted with its retractable undercarriage the single-engined performance should at least be quite satisfactory.

Structurally this new Miles twin is entirely similar to the Messenger. The fuselage is made up of ply panels on U-shaped frames, reinforced where local strength is required, while the wing is of the conventional Miles ply-covered box structure and the tail-plane is of a cantilever type with, unlike the Messenger, only two fins and rudders. Although there are means of entry into the rear part of the fuselage for purposes of inspection, it does not incorporate a hold for luggage, which is carried in the nose, where there is a hinged door forming the entry fairing. This nose compartment is large enough for the stowage of normal amounts of luggage in units which are not too large.



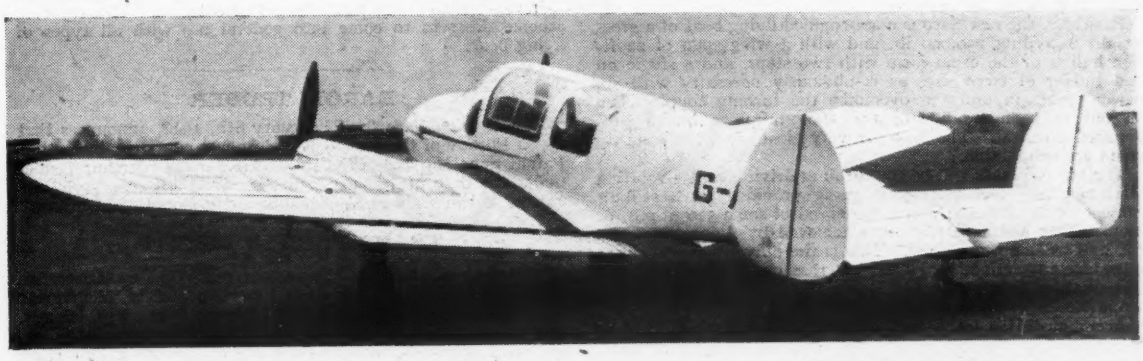
The standard fuel arrangements in the Gemini consist of two crash-proof 18-gallon tanks in the centre section, and an additional pair of 12-gallon tanks may be included, installed outboard of them. These extra tanks, in fact, make up part of the normal equipment of the standard aircraft, which also has full blind-flying equipment. In this form the Gemini carries a payload of 764 lb.—made up of 480 lb. for the three passengers and 284 lb. for luggage and incidentals. If, however, a greater payload is required, the aircraft will also be available in less fully equipped form, and the saving in weight permits a total payload of 900 lb., excluding the weight of the pilot, in an all-up total of 3,000 lb. These, and the figures given in the table overleaf, are estimated.

The cabin is arranged to carry a pilot and three passengers in pairs. The rear seat is unbroken across the 3ft. 9in. width of the cabin, while the separated front seats can be hinged forward so that floor stowage space may be reached and the pilot's seat is adjustable for angle on the ground. Like the Messenger, the Gemini has a deep one-piece Perspex windscreen and the two cabin doors are hinged at the roof-line and balanced so that they remain in any set position while on the ground. Each carries a sliding Perspex panel to provide bad-weather view and/or additional ventilation in hot weather. These doors can be instantaneously jettisoned by means of handles in the roof which, in the usual way, withdraw the hinge-pins.

Entrances and Exits

Entrance from either side of the aircraft is tolerably easy in spite of the usual difficulties experienced with any low-wing type. Since, however, the flaps extend inwards up to the fuselage and are aft of the trailing edge, there is a possibility that, on a wet day, a pilot or passenger might slip off the centre-section and cause damage to them. We feel that they should be stiffened to allow for this unhappy possibility. The words "no step" are of academic interest only to the sprawler. Even with the engine cowling ahead of one the view in the Messenger is extremely good, so, since the Gemini is merely a Messenger in twin-engined form, the range of forward view is as complete and unobstructed as might be imagined.

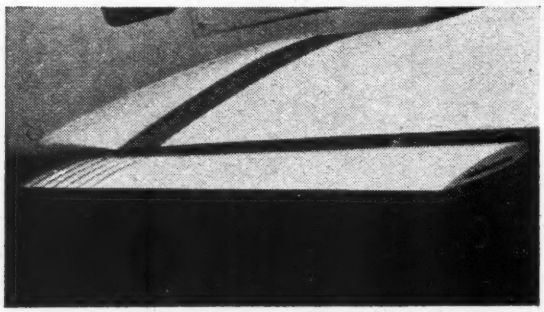
The gyro instruments, though grouped in the familiar



The Messenger ancestry of the Gemini is unmistakable. There are two top-hinged "balanced" doors, each with a large sliding window. Luggage is carried in the nose.

MILES GEMINI

Service order, are not mounted in a separate panel, but are carried in a larger anti-shock-mounted centre panel on which is included the two revolution counters, oil pressure gauges, and fuel contents gauges. The flap indicator is on the left below the auxiliary electric power panel already



The Miles high-lift flaps will eventually be electrically operated. In the prototype they are lowered by means of a hand-wheel.

mentioned, and, to the right of the centre panel, there is a large cubby hole. Below this is a clock, and to the left a rudder-adjustment release which will be familiar to those who have handled Masters or Martinets. When the control is pulled out the rudder pedals are free to move backwards or forwards until relocked in the chosen position. The brake lever is on the same axis as the throttle levers, so that all three can be operated together.

Although the name of this new Miles aircraft might be considered to be natural, since it is no doubt a heavenly twin, one questions the advisability of using a name which can be pronounced in so many different ways and which is, in any case, far from easy on the tongue. No doubt future owners will invent their own variations of the word, but it might be as well to coin a new one before the worst happens.

MILES GEMINI
Cabin Monoplane for Pilot and Three Passengers

Dimensions

Span	36ft. 2in.
Length	22ft. 3in.
Height (tail down)	7ft. 6in.
Track	10ft. 11in.
Wing area (gross)	191 sq. ft.

Weights

Fully equipped	1,910 lb.
Pilot	160 lb.
Passengers (3)	480 lb.
Luggage	284 lb.
Fuel (250 miles range)	130 lb.
Oil	36 lb.
Gross weight	3,000 lb.

Note :—With maximum fuel load, for 820 miles range, payload will be reduced by 308 lb.

Estimated Performance (at 2,800 lb.)

Maximum speed	150 m.p.h.
Cruising speed	130 m.p.h.
Rate of climb (sea level)	870 ft./min.
Distance to clear 50ft. (5 m.p.h. wind)	310 yd.
Landing run (5 m.p.h. wind)	125 yd.
Indicated stalling speed	35 m.p.h.
Maximum range (still air)	36 gall. fuel ... 520 miles.
	60 gall. fuel ... 820 miles.

A Six-engined Saro

Ambitious Flying Boat Project of More than 100 Tons

THE front cover of *Flight* of December 20th, 1945, depicted a huge flying boat beginning its take-off run, its port and stern navigation lights being set off against a night sky, and its two rows of illuminated portholes indicating a double deck for the passengers. Hitherto, Saunders-Roe, Ltd., the designers of the machine, have not wished any information about the project to be published, but they have now agreed to a few preliminary facts being given.

So far, no order has been placed for the new flying boat, but the project has been carefully studied by those most closely concerned in deciding our policy, and it is to be hoped that Saunders-Roe will be given an opportunity to translate project into actuality. In the meantime, work has begun on various mechanical tests of some of the large structural components and on a very impressive mock-up.

In general design the large flying boat is fairly orthodox. In fact, it is one of the advantages of the flying boat that it can be scaled-up very considerably without the process introducing untried features. This is not the case with landplanes, in which undercarriage problems become rather difficult when really large sizes are involved.

Basically, the new Saro is a six-engined flying boat of a gross weight exceeding 250,000 lb. and with a wing span of 220ft. The hull is of the usual form with two steps, and a single fin and rudder of large size, as is obviously necessary with six power plants in order to overcome the turning couple when an outboard engine is stopped. The tailplane has a pronounced dihedral. The lines are very clean, and the wing-tip floats are retractable.

The power plants will be gas turbines driving contra-rotating airscrews, and fuel tankage is being provided for a still-air range of 5,000 miles at a cruising speed of some 300 m.p.h. or more. This high speed is being achieved by flying high, and the hull will be pressurised. This is the only feature likely to introduce any serious problems; not that pressurisation is more difficult in a flying boat, but it is a difficult task in any large aircraft.

Accommodation for passengers will, of course, depend upon the degree of comfort which the operator decides to offer. Various schemes have been worked out, including some which give a number of small cabins and the sort of comfort and privacy obtained in a liner. There will be two decks, both pressurised, and the cross-section of the upper part of the hull is that known as a "double-bubble."

Handling of a large flying boat on the water is apt to be tedious, if not actually difficult, but the Gouge mooring system described in our issue of May 3rd, 1945, has been further developed and should simplify the manœuvre very greatly. By this system, it may be recalled, a hook in the keel under the bows automatically picks up a cable floating on the surface, held up by floats or small buoys. The pick-up secures the boat to the cable, which has stops on it at intervals, so that a winch ashore can haul the boat in. In the original scheme a launch was used for swinging the stern around so as to bring the hull into line with the cable. An improvement has now been worked out whereby another automatic pick-up just ahead of the rear step catches the cable when the pilot, after making contact with the forward hook, opens the engines on one side, thus swinging the stern around until the rear hook engages the cable. Thus the use of a launch, with its risks of collision and damage in rough water, is avoided, and the flying boat crew attends to everything without outside aid. This mooring scheme deserves to come into general use with all types of flying boat.

BARON TEDDER

THE *London Gazette* of February 8th, 1946, announces that a Barony of the United Kingdom was conferred by Letters Patent upon Marshal of the Royal Air Force Sir Arthur Tedder under the date of January 23rd "under the name, style and title of Baron Tedder, of Glenguin in the County of Stirling."

TRANS-PACIFIC FLIGHT

THE first of the four Skymasters purchased by Australian National Airlines arrived at Essendon airfield, Melbourne, last Saturday after a direct flight from Suva, Fiji Islands, having completed its journey from San Francisco in 67 hr. 48 min. The flying time for the 8,075 miles trans-Pacific flight was 30 hr. 51 min. Landings were made at Honolulu and Suva.

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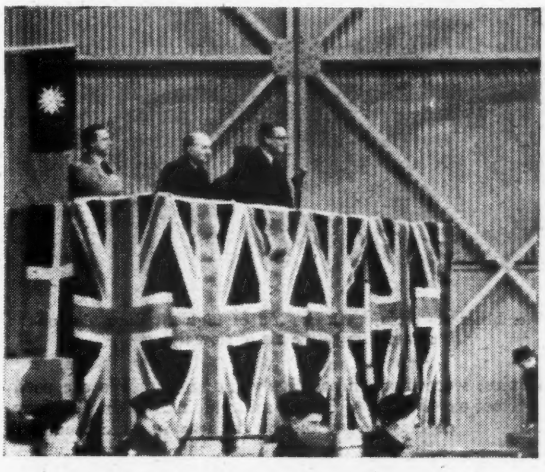
U.N.O. Sees Our Best

The United Nations' Display at Radlett : Latest British Military and Civil Types Demonstrated

WHETHER the idea originated at the highest levels, or whether it was the last-minute brainwave of one of a thousand untrumpeted officials, the United Nations Display at Radlett was undoubtedly a good one. And, with one of two absentee exceptions, this display was usefully representative both of civil and military types.

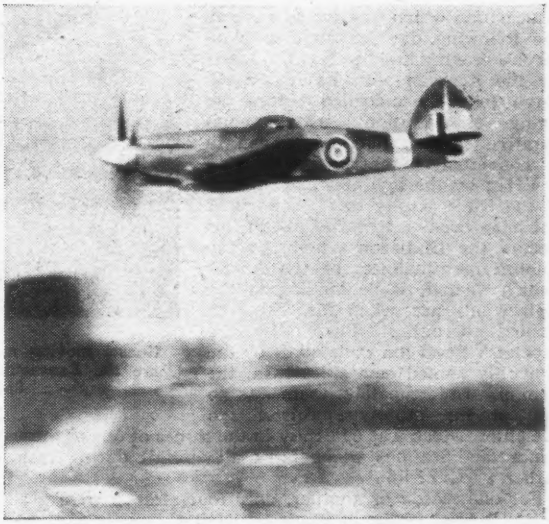
Even if, so soon after the war, the larger transport types were necessarily few in number, those who had the requisite imagination could guess, from the impressive performance and variety of the demonstrated military types, that the efforts of the British aircraft industry are more than capable of equalling those of any other nation. An industry which can produce the really outstanding fighter and heavy bomber types in war or near-war conditions and can, at such short notice, produce good sound transports which are at least as good as any others at present obtainable, is certainly not to be laughed aside.

Of course, the value of the display as an international piece of publicity, or as a means of selling aircraft abroad might, overall, be doubtful. Though a few military attachés and others with technical knowledge would undoubtedly have been impressed, the average politically-minded representative is not likely to be sufficiently knowledgeable to have been other than superficially interested. The display's value was largely, like all others, that of providing domestic encouragement to our own industry and of giving the members of this industry a chance to get together and to see the rival products in pleasant and informal conditions. If, in fact, it produced any marked international trade results then so much the better.



Mr. John Wilmot, Minister of Supply and Aircraft Production, welcomes the visitors to Radlett. Sir Frederick Handley Page is on the left of the Minister.

Fortunately for all concerned, Sunday was a typically good winter's day, with broken storm clouds, a strong wind to assist take-off—even if it was rather off the runway—and really good visibility. It was not too cold, and the flying display, so far as safety regulations permitted, was run off with admirable vigour and despatch. For those who were bored with the proceedings—which, though nobody in the flying business can ever be made to see it, *can* be somewhat tedious to the uninitiated—there was refreshment to be had in a warmed hangar. This, happily for those with feeble circulations, was used for the "opening" ceremony, which consisted of a short explanation by the Minister of Supply and Aircraft Production, Mr. John Wilmot, who had been introduced with commendable brevity by Sir Frederick Handley-Page—commendable if only because the first aircraft in the flying programme, a Meteor III, was already in the air before Mr. Wilmot had completed his introductory remarks.



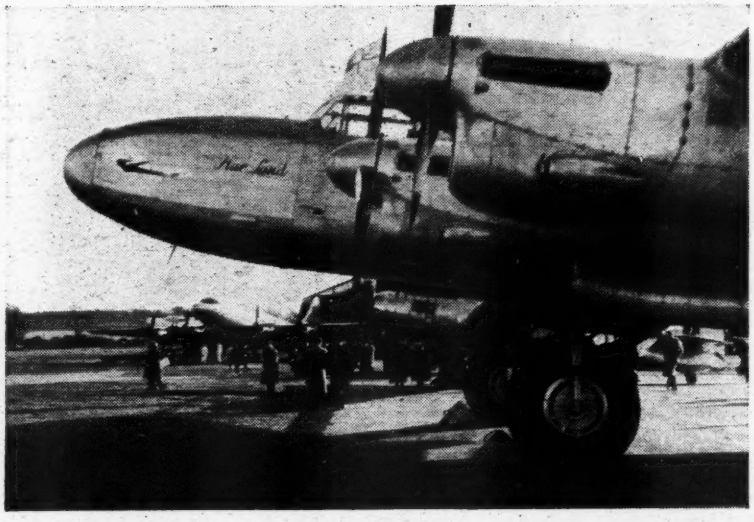
The Supermarine Spiteful making a high-speed run across the airfield after a dive approach.

Previously all the aircraft concerned—though by no means all those listed in the official programme, which with natural enthusiasm, included all but the more "shrouded" civil types which are in process of development—had been available for external and internal inspection by the guests. They were duly impressed by the roominess and comfort of that excellent but far-too-seldom publicised "interim" transport, the York; by the long-stage appointments of

Mr. Eric Greenwood explaining to Russian delegates how the speed record was made by the Gloster Meteor.

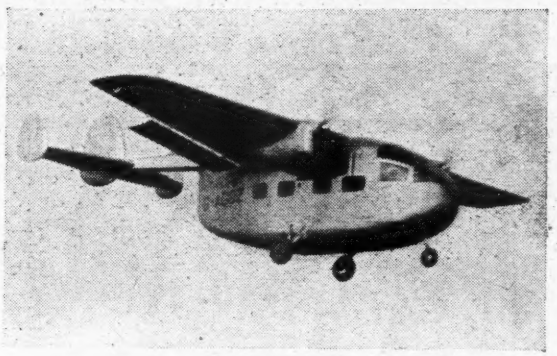
U.N.O. SEES OUR BEST

the first production Tudor I (shown and later flown by Capt. Orrell, the Avro test pilot); by the Viking in all its common-sense glory; by the Civil Anson; by the British South American Lancastrian which was due to leave on the following day for another semi-service proving flight to Buenos Aires; by the Aerovan with its Austin car cargo (sensibly unloaded before the flying demonstration); by the comparative comfort obtainable even in a converted bomber, the Halifax C VIII; by the lightness and airiness of the Dove (a pity some seats could not have been temporarily put in this first of the Brabazon types); by the comfortable smallness of the Auster (which floated, while landing in the high wind, just when Mr. Edwards wanted to put it down); by the Proctor V; and (off the record) by the difficultly named new Miles twin, the Gemini. Unfortunately, there was no sign of the prototype Bristol 170 Freighter which was evidently in the throes of one of those minor modifications which beset all aircraft during their earlier weeks of life.



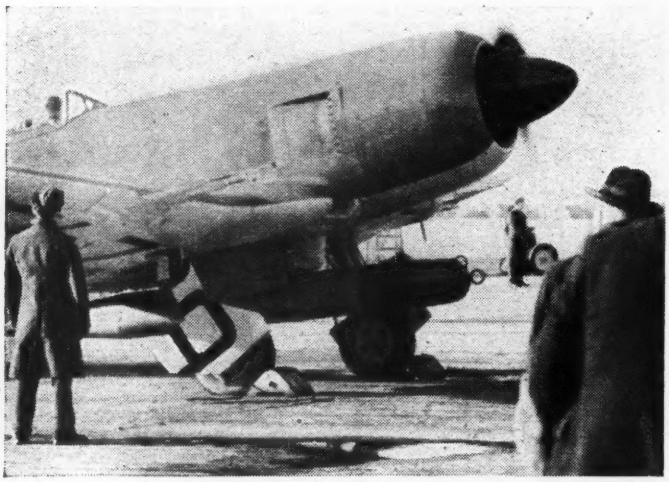
Guests moving among the aircraft lined up on the perimeter track. Included are the Lancastrian *Star Land* (due to leave for South America), the Fairey Spearfish and, in the background, the Avro Tudor.

For one reason or another, only four aircraft were permitted a brief period of aerobatics, but the pilots of those which were not permitted this freedom made the best of their opportunities at somewhat higher levels. After all, there is no reason why a fighter shouldn't make a circuit in a vertical rather than a horizontal plane if the driver feels so inclined. But the rule, though reducing the risk of boredom among the spectators and intensifying the effect of the aerobatic displays which were permitted, tended to put one or two of our best aircraft—notably the Sea Fury—in a somewhat disadvantageous position. Mr. Humble, the pilot, did his best while sticking to the spirit of the rule, the Firebrand, complete with torpedo, finished its fly-past on its back, and Mr. Fillingham lost little or nothing while demonstrating the Hornet in the usual effective manner. If jets had never been developed, that particular aircraft would certainly have taken more than its fair share of the cheers at any flying display.



The Miles Aerovan, with the aid of high-lift flaps, demonstrates the gentle art of slow flying.

The two jet fighters on show, the Meteor III and the Vampire, were most impressively shown off. We are used to perfect exhibitions of timing and placing by Mr. Geoffrey de Havilland, and by the way in which, helped perhaps by its small size, the Vampire gives a most astounding impression of sheer speed, but we have never previously seen the Meteor so well demonstrated as it was by Sqn. Ldr. Stansbury on Sunday. This Meteor was not, unfortunately, the actual aircraft expected, but no one was to know and speed is very much a matter of relative impression.



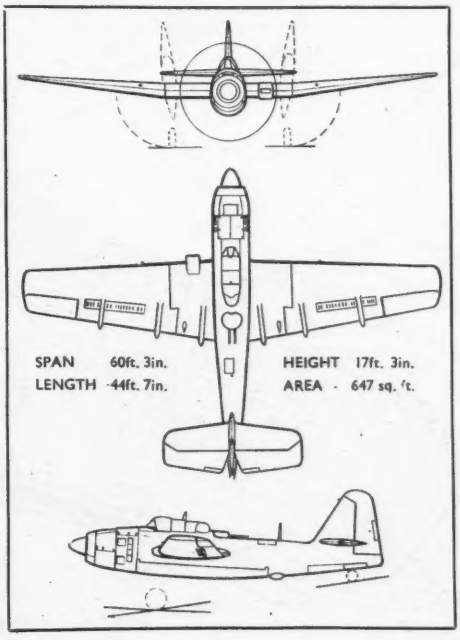
The Blackburn Firebrand—torpedo carrier and fighter—taxies out to take-off for a demonstration.

It would not be either reasonable or particularly useful to attempt to describe all the afternoon's demonstrations, from that of the Lincoln, flown by Sqn. Ldr. Field-Richards, to that of the Sea Fury, but there were, to our mind, two more outstanding shows amongst the airscrew-driven military aircraft. One by the Firefly IV (Lt. L. P. Twiss, straight from an E.T.P.S. course) and another by the Spiteful (Mr. Jeffrey Quill). Both pilots had been permitted their five minutes of aerobatics, and each made the best and most impressive use of them. The Spiteful, in particular, looked as fast as it really is, and the series of upward "reversing" rolls were just about perfect—Mr. Quill must have found something pretty definite in the way of a cloud against which to aim.

FAIREY SPEARFISH

Naval Two-seater for Combined Dive-bombing, Torpedo-carrying and Reconnaissance Duties : Bristol Centaurus C.E.58 Engine

IT is appropriate, on introducing the Fairey Spearfish, to point out that this multi-purpose two-seater, now well advanced in its flight testing and development stages, is the largest aircraft so far produced for the Royal Navy. The story of the Spearfish, which has much in common with that of other Naval types, plainly brings out the reasons for building small numbers of an aircraft which is most promising in its class and embodies several very novel features.



Multiple Duties

For the obvious reasons that multiplicity of aircraft types and spares must be avoided for carrier-borne squadrons, because a good deal of extra equipment and complication is demanded for Naval operation, and finally because much of the equipment, particularly the radio, is duplicated as a provision against failure, the performance of versatile Naval aircraft, type for type, cannot normally compare with that of their single-purpose land-based counterparts.

The Spearfish follows very closely the specification 0.5/43, and the basic design was settled in the summer of 1943. Several interesting and advanced designs were submitted by the Fairey company to meet the original specification; these included a conventional twin-engined aircraft and a two-engined aircraft of the type now exemplified by the Ryan Fireball with piston engine in the nose and turbine jet in the tail. It may now seem a little disappointing that the most conventional single-engined layout was finally selected, but in August, 1943, things appeared in a very different light.

Choice of Engine

The type of engine to be installed in the Spearfish was for some while unsettled, but an experimental Rolls-Royce unit, the Exe, at that time appeared most suitable; the Sabre or the Centaurus, now fitted, were alternatives. In that a primary requirement of the aircraft was the provision for dive bombing at angles up to the vertical without exceeding the maximum level speed, the question of airscrew braking arose and the selection of the power unit and the availability of suitable airscrew or contra-rotating airscrews became of great importance.

After its primary duties of dive bombing and torpedo attack, the Spearfish is required for day and night reconnaissance, shadowing and anti-submarine patrol. It is also, of course, intended for carrier-based operation, and, therefore, embodies folding wings, arrester hook and provision for assisted take-off. A pilot needs every aid when opera-

FAIREY SPEARFISH

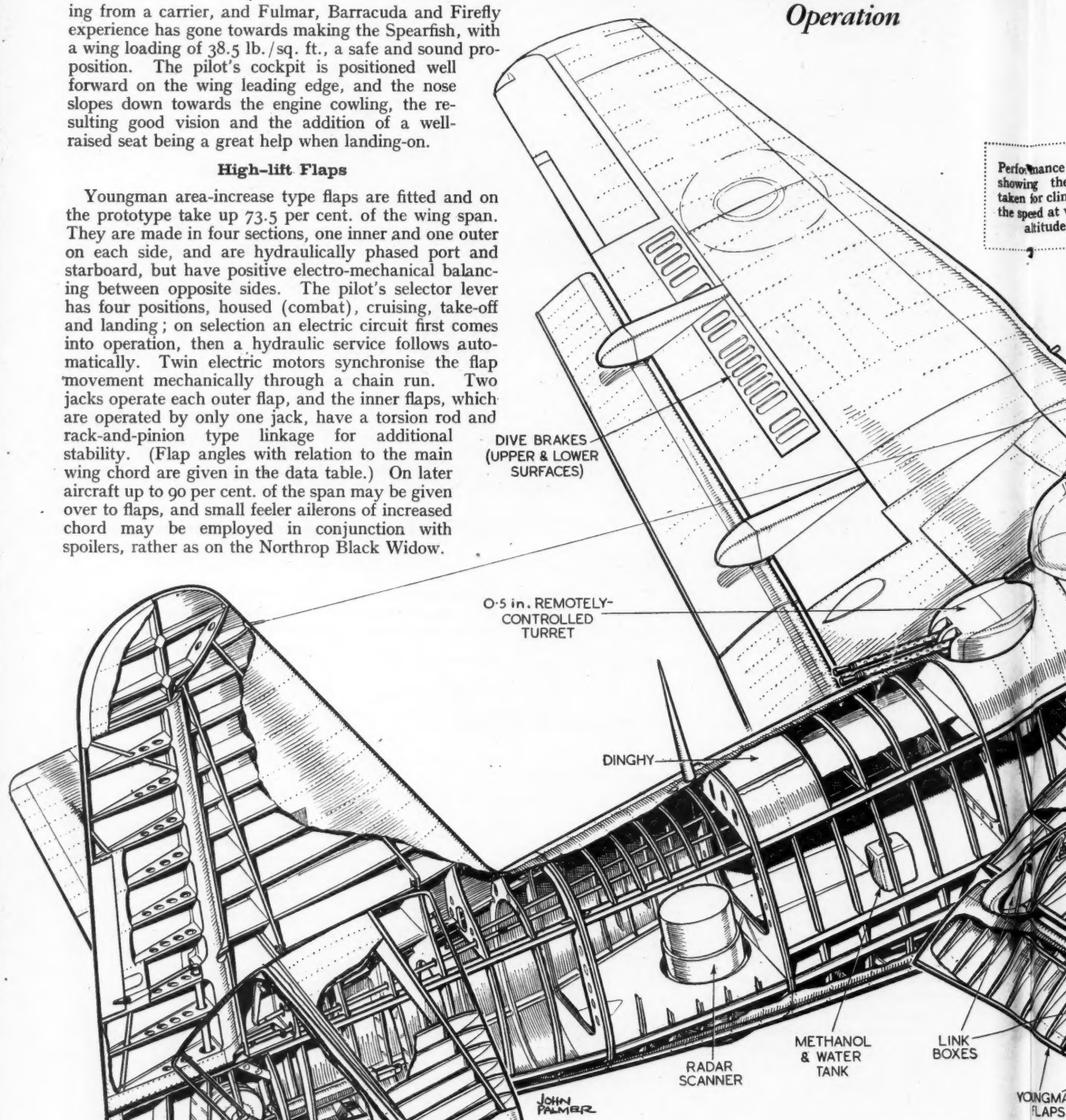
Two-seater Mk. I Torpedo Bomber Version for Carrier Operation

ing from a carrier, and Fulmar, Barracuda and Firefly experience has gone towards making the Spearfish, with a wing loading of 38.5 lb./sq. ft., a safe and sound proposition. The pilot's cockpit is positioned well forward on the wing leading edge, and the nose slopes down towards the engine cowling, the resulting good vision and the addition of a well-raised seat being a great help when landing-on.

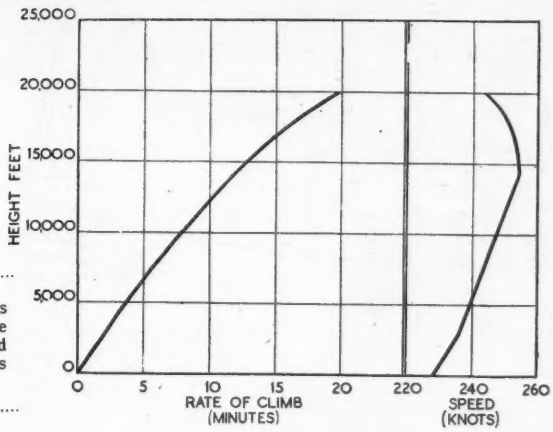
High-lift Flaps

Youngman area-increase type flaps are fitted and on the prototype take up 73.5 per cent. of the wing span. They are made in four sections, one inner and one outer on each side, and are hydraulically phased port and starboard, but have positive electro-mechanical balancing between opposite sides. The pilot's selector lever has four positions, housed (combat), cruising, take-off and landing; on selection an electric circuit first comes into operation, then a hydraulic service follows automatically. Twin electric motors synchronise the flap movement mechanically through a chain run. Two jacks operate each outer flap, and the inner flaps, which are operated by only one jack, have a torsion rod and rack-and-pinion type linkage for additional stability. (Flap angles with relation to the main wing chord are given in the data table.) On later aircraft up to 90 per cent. of the span may be given over to flaps, and small feeler ailerons of increased chord may be employed in conjunction with spoilers, rather as on the Northrop Black Widow.

Perfo[illegible]mance
showing the
taken for clim
the speed at
altitude

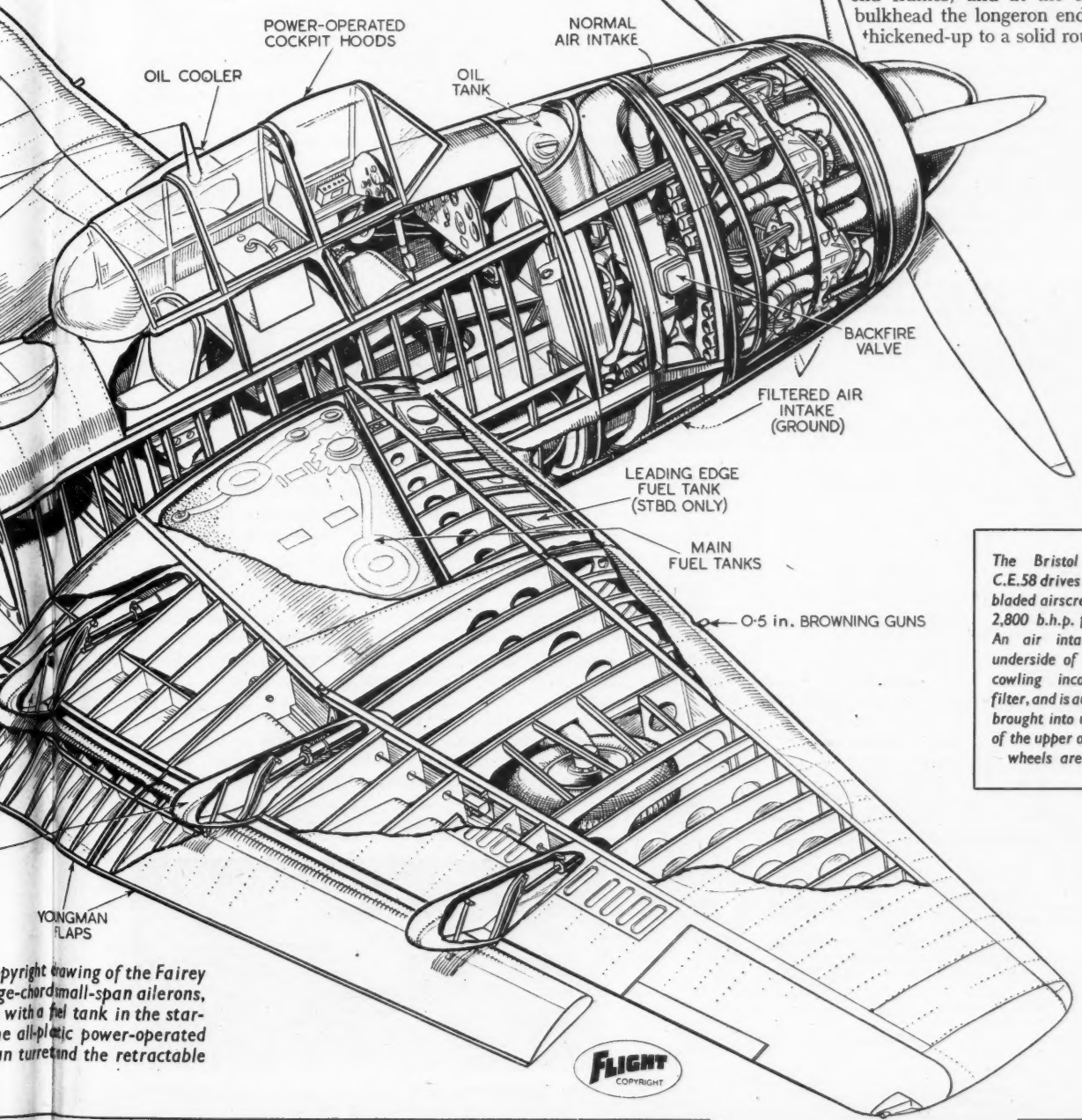


FEATURES of special interest shown in this FLIGHT copyright drawin Spearfish are the wide-span Youngman flaps, the large-chord small- the balancing of the oil cooler in the port leading edge with a fuel ta board edge, the outward retracting landing wheels, the all-plastic p cockpit enclosure, the remotely-controlled 0.5 inch gun turret and t radar scanner unit.



Performance curves showing the time taken for climb, and the speed at various altitudes.

The airframe is of all-metal construction, and the almost complete absence of tubular members is noteworthy. The fuselage, consisting of a light-alloy monocoque structure, is built in three sections; the front fuselage from engine bulkhead to rear spar; the rear fuselage from spar to a frame just forward of the tail fin; and the wedge (so called because of its shape) from this point aft. Four light-alloy extruded longerons of uneven channel section with pressed sheet frameworks, and the skin is made from light-alloy panels flush riveted to the frames and stiffeners. The frames are made in sections, and the top portion of the front fuselage is decked-over, while the rear portion is of a deep oval shape. The two main sections and the wedge are bolted together round their end frames, and at the engine bulkhead the longeron ends are thickened-up to a solid roughly



The Bristol Centaurus C.E.58 drives a Rotol five-bladed airscrew and gives 2,800 b.h.p. for take-off. An air intake on the underside of the engine cowling incorporates a filter, and is automatically brought into use in place of the upper one when the wheels are lowered.

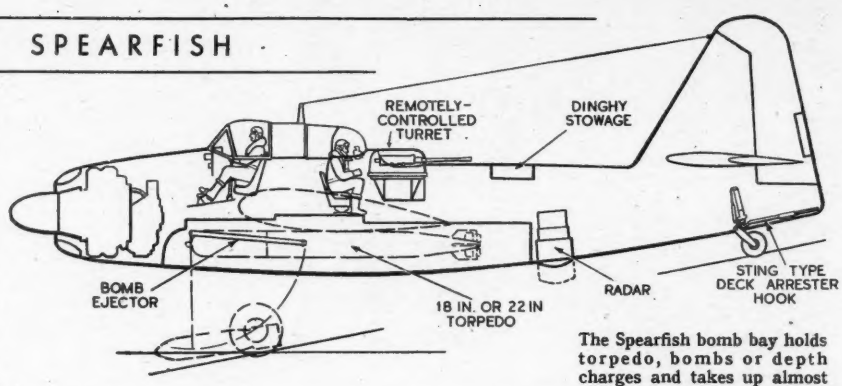
pyright drawing of the Fairey ge-chord small-span ailerons, with a fuel tank in the star- e all-plastic power-operated n turret and the retractable

FAIREY SPEARFISH

rectangular section and are drilled longitudinally through these ends to take the engine-mounting bolts.

Extending from the bulkhead to the retractable radar scanner unit near the tail, the bomb bay takes up roughly half the fuselage depth. The pilot's and observer's floor forms the top of the bay, and a hatch at the rear end gives one method of access to the rear cockpit and fuselage. The layout may be studied from the illustration above. It will be seen that the gun turret and dinghy stowage are above the rear end of the bomb bay; on the flooring below, though not shown in the drawing, are mounted the electric flap-synchronising motors and the methanol tank.

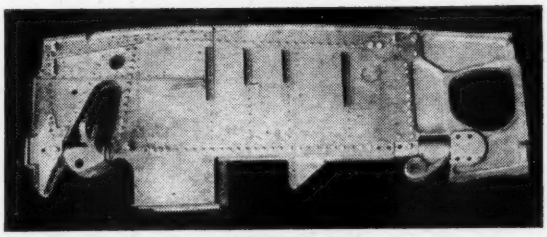
Among the special features of the Spearfish the cockpit enclosure is noteworthy. This is of transparent, plastic moulded construction with additional material cemented-on in place of a frame-work proper to stiffen the structure at edges and joints. The sliding panels are power-operated and at the rear terminate aft of the observer's cockpit in a gun-sight cupola for the remotely-controlled Nash and Thompson twin 0.5 gun



The Spearfish bomb bay holds torpedo, bombs or depth charges and takes up almost half the fuselage depth. The slope down from pilot's cockpit to aircraft nose is pronounced and ensures good forward vision.

turret. The windscreen is mounted on a hinged fairing which opens to give access to the back of the main instrument panel; the appropriate sections of the structure can be jettisoned in an emergency.

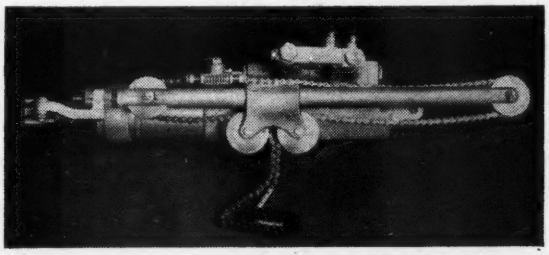
The width of the Spearfish with wings folded is about two feet more than the eighteen originally specified, but in that the tail plane span is also 20 feet, and three aircraft can still be stowed abreast in the normal carrier



The centre section chassis ribs terminate at each end in large light alloy forgings to carry undercarriage and folding wing fittings.

hangar, the increase in size of main tanks permitted in the wing centre section makes this an advantage. In view of the large size of the aircraft, the provision of folding tail plane tips was at first considered but this was later found to be unnecessary.

An unusual feature is the riveting of the webs to the centre section front spar booms; these booms are plain, solid, large-section, light alloy extrusions, and in view of their thickness, the drilling of holes for a number of large rivets would appreciably weaken them. Therefore, instead of drilling right through, holes are taken half-way and enlarged to a small cavity in the spar centre; expanding rivets are then inserted. The rear spar booms are attached to the light alloy sheet webs by a double row of large, full-length rivets; "Z" section stiffeners are also riveted to the spar webs. The wing roots are stiffened and strengthened on each side to take wing folding, and undercarriage attachment fittings by



A flap jack showing the chain for connection with the electric synchronising motors.

FAIREY SPEARFISH T.D. MK.I DIMENSIONS AND DATA

Performance (Torpedo aircraft)

Speed sea level	228 kt.
,, 14,000ft.	254 ,,
,, 20,000ft.	243 ,,
Climb to 5,000ft.	3 min. 40 sec.
,, 10,000ft.	7 min. 45 sec.
,, 20,000ft.	19 min. 15 sec.
Service Ceiling	25,000ft.
Take-off Run (wind 27 kt.)	480ft.
Economical cruising speed at 15,000ft.	170 kt.
Endurance	5.3 hr.
Range	900 naut. m.

Areas

Main plane and centre planes (with ailerons)	530.00 sq. ft.
Ailerons (with tabs)	38.50 ,,
Aileron tabs	3.25 ,,
Flaps	92.00 ,,
Dive brakes (unvented) top	25.00 ,,
bottom	20.00 ,,
Tail plane (with elevators)	116.80 ,,
Elevators (with tabs)	57.00 ,,
Elevator tabs (two)	2.90 ,,
Fin (with rudder)	56.40 ,,
Rudder (with tab)	26.30 ,,
Rudder tab (one)	1.30 ,,
Wing loading (torpedo aircraft)	41.5 lb./sq. ft.

Flaps (Youngman)

Housed position	flush.
Cruising position	3 deg. 25 min. (flap chord)
Take-off position (variable ground setting)	15 ,, 25 ,, ,, ,, to 25 ,, 25 ,, ,, ,,
Landing position	35 ,, 25 ,, ,, ,,

Weights and Dimensions

Main wing span	60ft. 3in.
,, (span wings folded)	19ft. 6in.
,, ,, dihedral	6 deg.
,, ,, sweep back	3 deg.
Overall length (tail down)	44ft. 7in.
Height (tail down, wings folded, airscrew optimum position)	16ft. 4in.
Overall height (tail down, wings folded, airscrew running)	17ft. 3in.
Tail plane span	20ft. 0in.
Track	16ft. 8in.
Normal all-up weight	21,642 lb.
Bomber (4 × 500 lb. bombs)	22,083 lb.
Bomber (1 × 2,000 lb. bomb)	22,010 lb.
Torpedo aircraft	22,021 lb.
Long-range reconnaissance	21,882 lb.

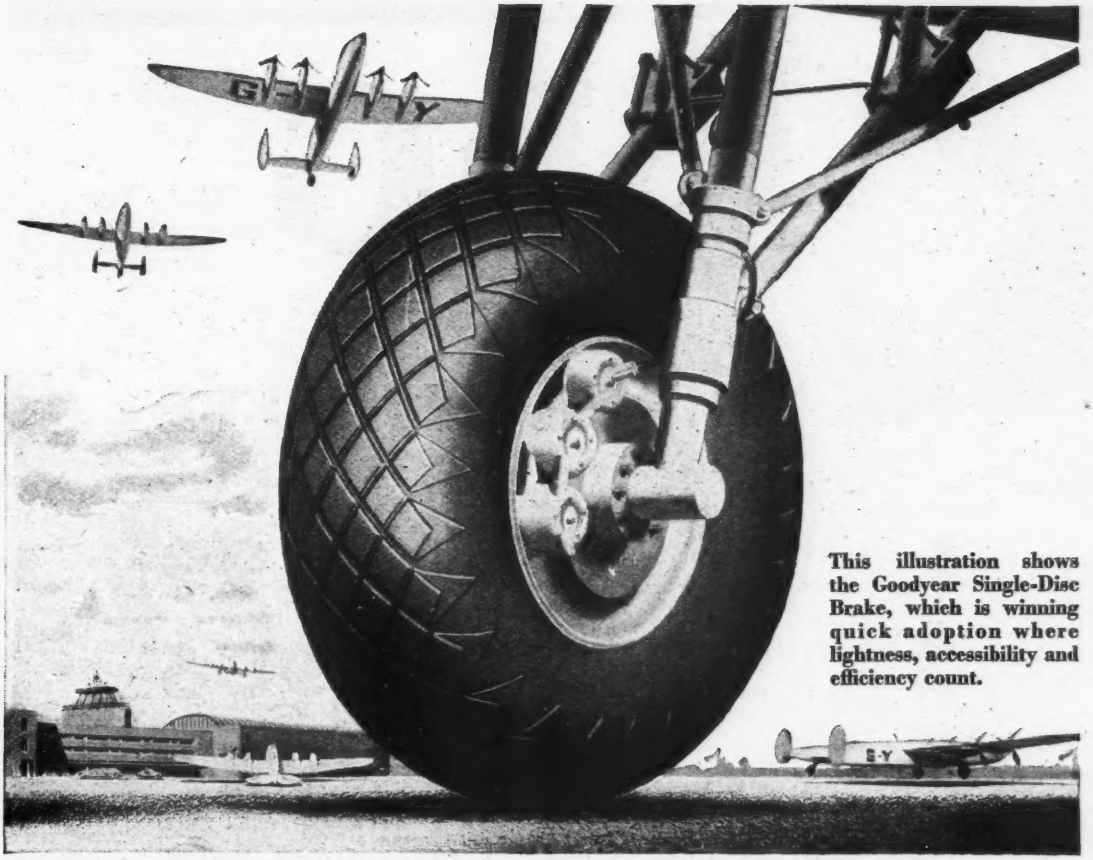
Engine and Airscrew

Engine Centaurus C.E.58, 18-cylinder, air-cooled, 2-row Radial.
Airscrew Rotol, V.H.65, 5-blade, 14ft. constant-speed tractor.

Take-off power	2,800 b.h.p. (with methanol)
Power loading at take-off	7.9 lb./b.h.p.
Max. level power at 14,000ft.	2,320 b.h.p.
Max. weak mixture cruising at 21,250ft.	1,535 b.h.p.

Fuel Tanks

Main port and starboard	2 × 183 gal.
Leading edge starboard	1 × 43 ,,
Overload total	1 × 180 ,,
Normal capacity total	409 ,,
Maximum capacity total	589 ,,



This illustration shows the Goodyear Single-Disc Brake, which is winning quick adoption where lightness, accessibility and efficiency count.

To be airborne, they needed air . . .

Twenty-five years ago, when Goodyear were pioneering the Giant Pneumatic Tyre, the aircraft industry was in its infancy. Both grew to swift maturity. Today the world's transport moves *over* the earth on Giant Pneumatic Tyres; the world's aircraft move *off* the earth — and land on to it again — on giant, airfilled tyres which are a direct development of the original Goodyear Giant Pneumatic. In every other aspect of aeronautics, too, Goodyear have marched side by side with the growth of the industry, until today, wherever there are planes, there you will find the name Goodyear, on a wide variety of plane parts, from a tyre to the complete aircraft itself. This experience is available to all Aircraft Manufacturers and Operators, who are invited to consult us on all matters relating to Tyres, Wheels, Brakes and other accessories listed in the panel on the right.

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AND

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1 MILE A MINUTE IN **1899**
By M. Jenatzy driving an electric car.
No plugs required.

2 MILES A MINUTE IN **1906**
By Mr. Marriott driving a Stanley steam car.
No plugs required.

3 MILES A MINUTE IN **1927**
By the late Sir Henry Segrave driving a Sunbeam using K.L.G. Plugs.

4 MILES A MINUTE IN **1931**
By Sir Malcolm Campbell driving a Napier-Campbell using K.L.G. Plugs.

5 MILES A MINUTE IN **1935**
By Sir Malcolm Campbell driving his Rolls-Royce using K.L.G. Plugs.

6 MILES A MINUTE IN **1939**
By Mr. John Cobb driving a Railton car using K.L.G. Plugs.

10 MILES A MINUTE IN **1945**
By Group Captain H. J. Wilson flying a Gloster "Meteor" Aircraft fitted with K.L.G. Igniter Plugs and Thermo Couples.

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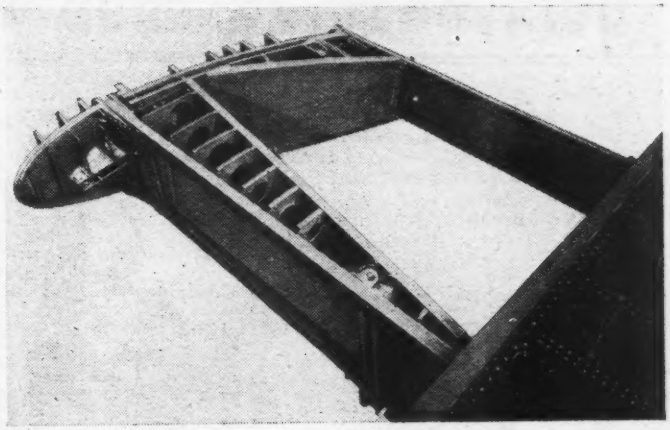
FAIREY SPEARFISH

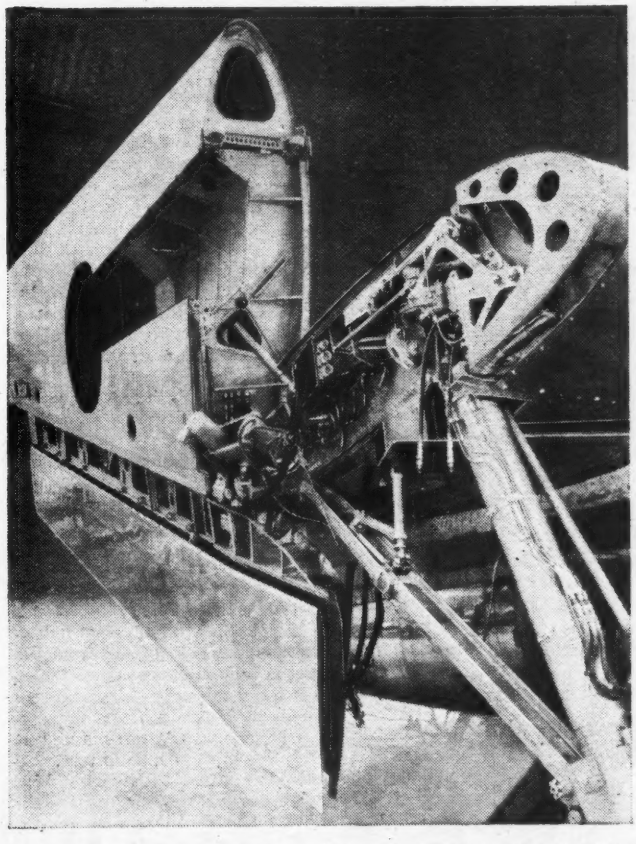
the addition of an auxiliary front spar and a rib, both set at an angle to the main ones. Even so, as will be seen from the illustration on this page there is a remarkable paucity of structural members. The construction of the wing centre section, which is integral with the fuselage, is otherwise conventional. It is made in one piece, with spars passing through the fuselage, and houses the two main fuel tanks in the roots between spars.

The outer wing sections are built up round two spars with "L" section booms tapering towards the wing tips and "L" and "Z" shaped stiffeners for the webs. The ribs are sheet pressings, and the skin is attached by flush riveting as on the fuselage. The leading edges are built up on the spar after the inter-spar ribs have been attached. The trailing edge units incorporating the flap shrouds, have separate auxiliary spars which carry the hinge fittings for the dive brakes; in addition, each has a second spar-like front member which is bolted to the rear main wing spar when the section is attached.

Where additional strength is required, the main ribs are made from double sheet with lightening holes flanged in opposite directions; at the landing wheel wells, cover plates are placed over the rib lightening holes, and the nose ribs at this point are stiffened. At the folding point of the wings, the centre-section ribs and the spar ends are reinforced with light-alloy forgings to take undercarriage, wing-lock and hinge fittings. (See illustration on the previous page.)



Two of the three self-sealing fuel tanks are carried in the starboard wing root, one between spars, and one in the leading edge. Even with an auxiliary front spar and rib the scarcity of structural members is remarkable. The apparent absence of rivets on the front spar booms is due to the use of expanding internal rivets.



Photographed during assembly: points to be noted are the retracted flap, the housing and hinge points for the lower dive brakes, the leg and wheel well, the two wing-folding jacks sandwiched between their triangular operating links, and details of the undercarriage attachment (jack disconnected).

The wings fold up and back to lie parallel to the fuselage, leading edge uppermost. Two hydraulic jacks fold each wing and these, placed almost side by side, work in opposite directions. The jack bodies are attached to triangular links on the hinges, which are located at the rear spar, and the rams are anchored. One jack pushes the wing up, the other pushes it round and back. At each joint are two latch pins, which pick up at the upper and lower front spar booms; and a single jack, via linkage, withdraws or inserts one pin forwards, the other rearwards. On releasing the latch pins, a small panel over the joint in the top wing surface is also released and springs open.

The Undercarriage

It can have been no easy matter to arrange for the retraction of so large an undercarriage as that required for the Spearfish, but a creditably simple and clean system has been produced. A large jack, located spanwise between main and auxiliary front spars in the centre plane, retracts the leg and wheel into the outer wing in 8-10 seconds. Large oleo-pneumatic shock-absorber struts are fitted, and at the lower end, massive light-alloy forgings of the cranked, half-fork or single-sided type are employed. A rear link member attaches to an extension of the forging carrying the wing hinges, and is caused to fold knee-wise by a small telescopic strut when the wheel is retracted. There is also a smaller side link on the top inboard side of the leg. (See illustrations left and on page 168.)

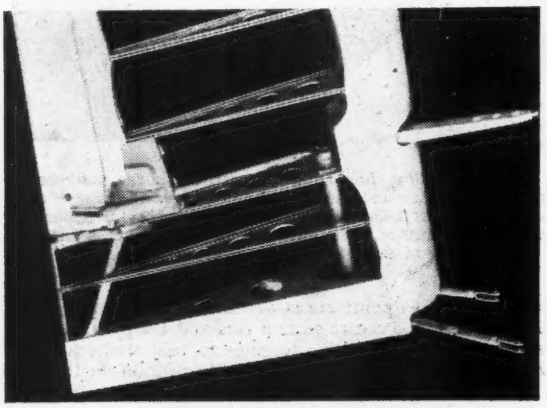
All undercarriage fairings are carried on the legs themselves, and the wheels, which fit snugly into their wells, remain uncovered. There is a large forward rake on the legs, and they have a positive down lock.

Also retractable, the tailwheel is oleo-pneumatically sprung and incorporates an anti-shimmying device for landing and take-off; this causes the tail wheel to lock in the fore-and-aft position when the stick is held right back. The doors which enclose the tail wheel in the retracted posi-

FAIREY SPEARFISH

tion also house the arrester hook. This is released by the pilot from a forward-pointing position inside the port door and swings down and backwards to the streaming position. The arm of the arrester hook has a catch which permits it to break horizontally so that it can be folded forwards for restowage after landing.

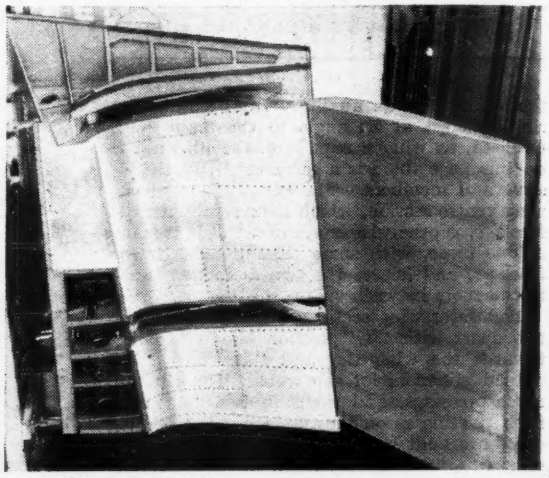
Although neither dive brakes nor airscrew-braking are provided on the first two Spearfish, later ones are to be fitted with vented dive brakes. At present under development, these will fold out, simultaneously, to the 90-degree position, from the top and bottom wing surfaces just aft of the rear main spar. They will be required to operate in one-eighth of a second in the dive at speeds up to the maximum permitted, and the T.V. of the aircraft with brakes must not exceed the maximum for level flight. Each pair of brakes has four hydraulic jacks and the upper surface is linked to the lower for operation.



The rudder is of typical Fairey metal construction and is shown minus its fabric covering. The torsion rod and link to the servo tab may be seen.

All control surfaces are of metal construction and with the exception of the rudder have metal skins. The rudder has a metal leading edge and horn-balance covering but is otherwise fabric covered. Metal servo tabs are also common to all control surfaces, and the elevators and both ailerons have additional separate trimming tabs. It is noteworthy that the elevators, which are of particularly sturdy construction, are made in one piece and have a single through-spar.

On later aircraft it is intended to fit hydraulic servo ailerons, and the system is at present being developed. In the event of hydraulic failure, sufficient direct control will remain to the pilot to make ordinary manœuvres and a normal landing on a runway or a carrier.

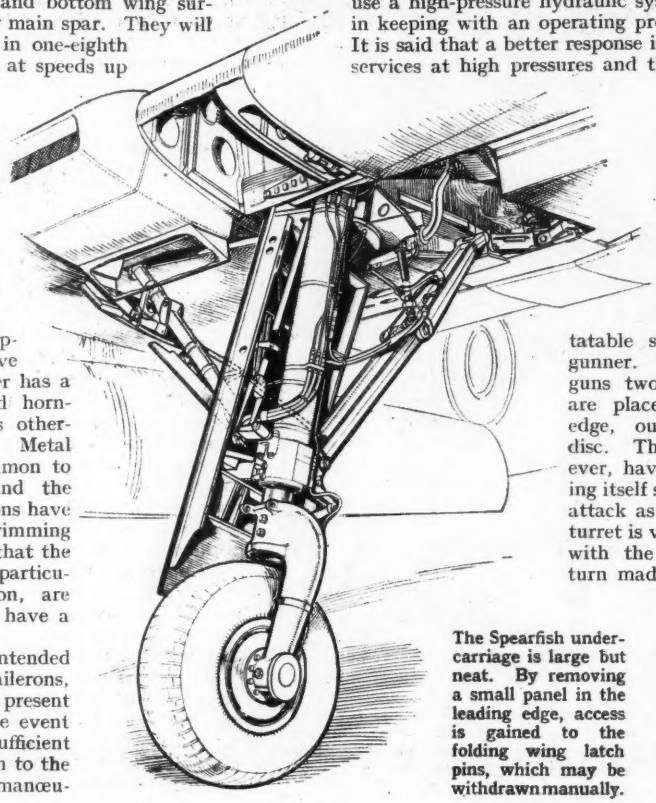


A Youngman flap on test in its fully extended position. Note the lower linkage embodying rack and pinion gear peculiar to the centre-section flaps.

One or two small but useful items of equipment are worthy of comment; among these is the provision of a large curved ladder for access to the cockpits. Another feature is the stowage of batteries which are normally attached inside the bomb bay under the cockpit floor but may be lowered in trays suspended on wires, or wound up again; the reel works in a similar manner to that on a fishing rod. Ultra-violet lighting is fitted in both cockpits, and direct communication between pilot and "observer" is possible through a small door in the armoured partition.

Since Barracuda days it has been a Fairey custom to use a high-pressure hydraulic system, and the Spearfish is in keeping with an operating pressure of 2,500 lb./sq. in. It is said that a better response is obtained when operating services at high pressures and that the need for bleeding is almost eliminated.

The armament of the Spearfish is of special interest, particularly as it is the first aircraft of its type to be fitted with a remotely controlled turret. The turret is of Nash and Thompson design, and carries two 0.5in. Browning guns. A rotatable seat is provided for the gunner. In addition to the rear guns two more 0.5in. Brownings are placed in the wing leading edge, outboard of the airscrew disc. The Spearfish would, however, have little chance of defending itself successfully against fighter attack as the field of fire from the turret is very interrupted, and even with the unusually high rate of turn made possible by its flaps, it could not out-manœuvre fighters indefinitely.



The Spearfish undercarriage is large but neat. By removing a small panel in the leading edge, access is gained to the folding wing latch pins, which may be withdrawn manually.

For dive-bombing duties an ejector is fitted to throw bombs clear of the airscrew. Alternative loads include bombs, one torpedo, four depth charges, thirty multi-flares, or one long-range

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Air Vice-Marshal D. C. T. Bennett, C.B., C.B.E., D.S.O., formerly head of the R.A.F. Pathfinder Force, and now of British South American Airways, himself captained the successful "proving" flight on the Rio de Janeiro service in the Avro Lancastrian "Star Light." Inaugurating London's new airport, Heath Row, Lord Winster (Minister of Civil Aviation) is seen at the microphone, before the departure. Air Vice-Marshal Bennett (holding a case), praising the Lancastrian from his personal experience, said that it had "all the attributes of a good airliner—comfort, speed and safety." Once more Avro leads the way—with a reputation that will be still further enhanced when the Avro Tudor comes into service.

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FAIREY SPEARFISH

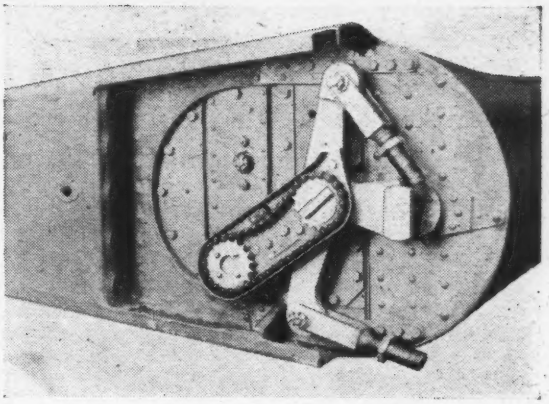
fuel tank. The Spearfish has a structural safety factor of ten at its operational weight.

Compact Centaurus Installation

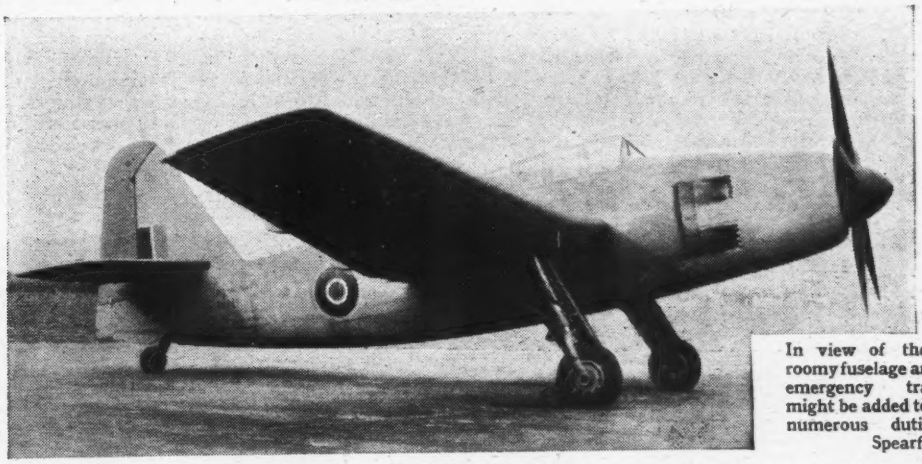
The unusually neat engine installation embodies some interesting features. For normal flying the top forward-facing air intake is used, but on lowering the wheels, or by a separate control, an underside air intake can be brought into use which incorporates an air filter. This intake is through a series of parallel transverse shrouded gills, flush with the cowlings, which reverse the flow of the air as it enters, thus giving a good measure of centrifugal filtering. A third internal hot-air intake may also be used, and the system includes two ducts with flaps as a protection against back-firing. The oil tank is wrapped in glass wool and mounted high up on the engine side of the fireproof bulkhead. The oil cooler in the port leading edge is of the same type as that used for the Firebrand.

The Spearfish is intended for medium-altitude operation, and the Bristol Centaurus 58, which has interconnected throttle and airscrew controls, gives a combination of economy and high cruising power at altitude. At 21,250ft. 1,539 b.h.p. is delivered for a consumption of 0.455 lb./b.h.p./hr., and at the same altitude in rich mixture the power output is 2,060 b.h.p. These and the take-off power are well within the capacity of the engine.

It cannot be said that the performance of the Spearfish is outstanding by comparison with other specialist aircraft, nor that the general specification is very advanced. The machine is, however, a sound mechanical job with lavish equipment and good range. It is more than capable of doing the work to be assigned to it and is an aircraft from which much useful experience will be gained in connection with auxiliary flying controls.



Main, servo and trimming controls on the rudder. The dog on the centre sprocket engages with a corresponding slot on the trimming controls in the fuselage wedge so that bias may be set on the torsion bar.



In view of the unusually roomy fuselage and bomb bay, emergency transportation might be added to the already numerous duties of the Spearfish.

"HUMP" FINALE

IN our issue of January 17, we referred to the closing of the "Hump" route to China. Although this route was pioneered by the U.S. Air Transport Command and the Chinese National Aviation Corporation, the R.A.F. put in a very considerable effort in flying supplies over this route to China, particularly during the later stages.

When American participation ceased in September last year, No. 52 Squadron, R.A.F. carried on, completing 15,000 hours over the route in eighteen months with the loss of only one aircraft. Between July, 1944, and December, 1945, this Squadron made 830 crossings of the "Hump" to Kunming, carrying 3,277 passengers, 1,916,443 lb. of freight and 44,834 lb. of mail. Other R.A.F. units which have taken part in these operations into China are Nos. 298, 257, 159, and 31 Squadrons and 1,341 Flight. In 1942, No. 31 Squadron made 150 trips over the route.

From its inception, early in 1942, the "Hump" service steadily developed until it attained a frequency of more than 200 aircraft a day. The original route forced aircraft well to the north over mountain peaks seventeen thousand feet high, in an attempt to avoid Japanese interception, but later, as the Japanese were pushed south and more airfields became available, it was possible to fly a more southerly course where a maximum height of 13,000ft. proved sufficient to clear the mountain ranges.

One development of the "Hump" route was the efficient air/land rescue service which came into operation under American control. Doctors and nursing orderlies with complete surgical equipment were parachuted down to stranded crews, whose forced march back to India or China was covered each day by a friendly umbrella of aircraft dropping comforts and instructions. Even the head-hunting Naga tribesmen were persuaded, in many cases, to render valuable assistance to airmen forced down on the route.

TURBINES & RECIPROCATING ENGINES COMPARED

NEXT week's issue of Flight will contain a four-page coloured supplement with a graphic description of the action of a gas turbine compared to a four-stroke reciprocating engine.

American Newsletter

Modification Centre History : Pusher Tendencies : A World's Speed Record Attempt in April? : Transport Co-operation

By KIBITZER

THE American Institute of Aeronautical Sciences held its Honours Night Victory Dinner at the Waldorf-Astoria Hotel, New York, on the night of Monday, January 28th, 1946. At a rough guess, there were some 1,100 to 1,200 people present, with Lt. General James H. Doolittle as guest of honour. The presentation of the various awards occupied most of the after-dinner talks, there being only two "set" speeches, one by the guest of honour, entitled "An Evaluation of the Work of the Aeronautical Engineer in World War II" and another by Doctor Lester D. Gardner, which might well have been entitled "An Evaluation of the Generosity of the Aeronautical Engineer in 1945," but which was, on the programme, called "Gifts to the Institute."

The first was given with all the verve and force that one always associates with Jimmy Doolittle, and included many interesting and not generally known facts on technical and other developments. As is so often the case when development matters are discussed, the Modification Centre and its history was mentioned and, once more, the impression left with the audience must have been that this was an American innovation. Anyone who knows the story of this particular phase of production realises that the Modification Centre was a completely British development, later introduced into the American industry in order to deal with modifications to those American aircraft that were allocated to the British.

Even if it was viewed originally with some misgivings, the scheme was soon adopted by the U.S. Army Air Forces to cope with the flood of modification requests that began to come in from their own theatres of war. One always feels rather sorry for those who worked so hard on Modification Centres, both in England and America, and, although it is admittedly a small point, one would like to see the credit for their initiation given to the British. As a matter of record it is believed that the first Modification Centre in the States was run by American Airlines to modify Liberators, and that was very early in 1942.

Doctor Lester Gardner's speech, which followed, was, to a Britisher, rather an eye-opener. The astronomical figures in some of the bequests and endowments that had been bestowed on the Society in 1945 left one wishing that we in Britain had half of the financial and physical facilities that are available to aviation sciences over here. The great generosity that one always meets in the States is a never-ending cause of admiration, and Dr. Gardner's final crack that they really should thank Uncle Sam and the excess-profit duty for what they had received, deceived no one. Those interested in aviation in the States do really show their appreciation, if not always with hard cash, then in the donation of buildings, laboratories, libraries and the like, and the trade benefits accordingly. Amongst those Britishers—excluding Service personnel—who attended the dinner were the following members, or past members, of the British aircraft or its allied industries: Sir Watson-Watt, Edgar Percival, Christopher Clarkson, Massey Hilton, Reggie Brie, Woods-Humphreys and Paul Bewsher; if there were others, and we didn't see them, we apologise.

* * *

The success of the Douglas Mixmaster has caused rather a rush of blood to the head in connection with pusher-type aircraft—shaft-driven pushers, that is, with the airscrew(s) behind the tail unit. The little Lockheed two-seater "Dipper" is flying, how successfully is not known, but rumour says it performs quite satisfactorily. As well as being somewhat revolutionary so far as airscrew position goes, it also has an all-moving tailplane which is a most interesting development.

Pictures have also appeared of a model of a machine designed by Mr. Thomas Mountjoy, one of the Ercoupe engineers. This looks more attractive than does the Lockheed machine, and the airscrew is mounted inside a guard-ring, which is not only a great safety measure but might, one imagines, increase the tip efficiency quite a bit. It is a four-seater, tricycle-undercarriage project, with the engine totally enclosed just behind the passengers' heads, with a very narrow fuselage—almost a boom, in fact—carrying the shaft to the airscrew behind the tail-plane. It is also suggested that a small jet-assister for emergency take-off might be incorporated.

Another rumour is that Consolidated-Vultee are considering a pusher of this type, and it will be most interesting to see whether these machines come to anything. One would have thought that for small single-engined machines the extra complications and weight of a shaft drive would hardly have outweighed the advantages of reduced noise and the removal of slipstream from around the cabin. On a twin or multi-engined aircraft the advantages are, of course, obvious.

* * *

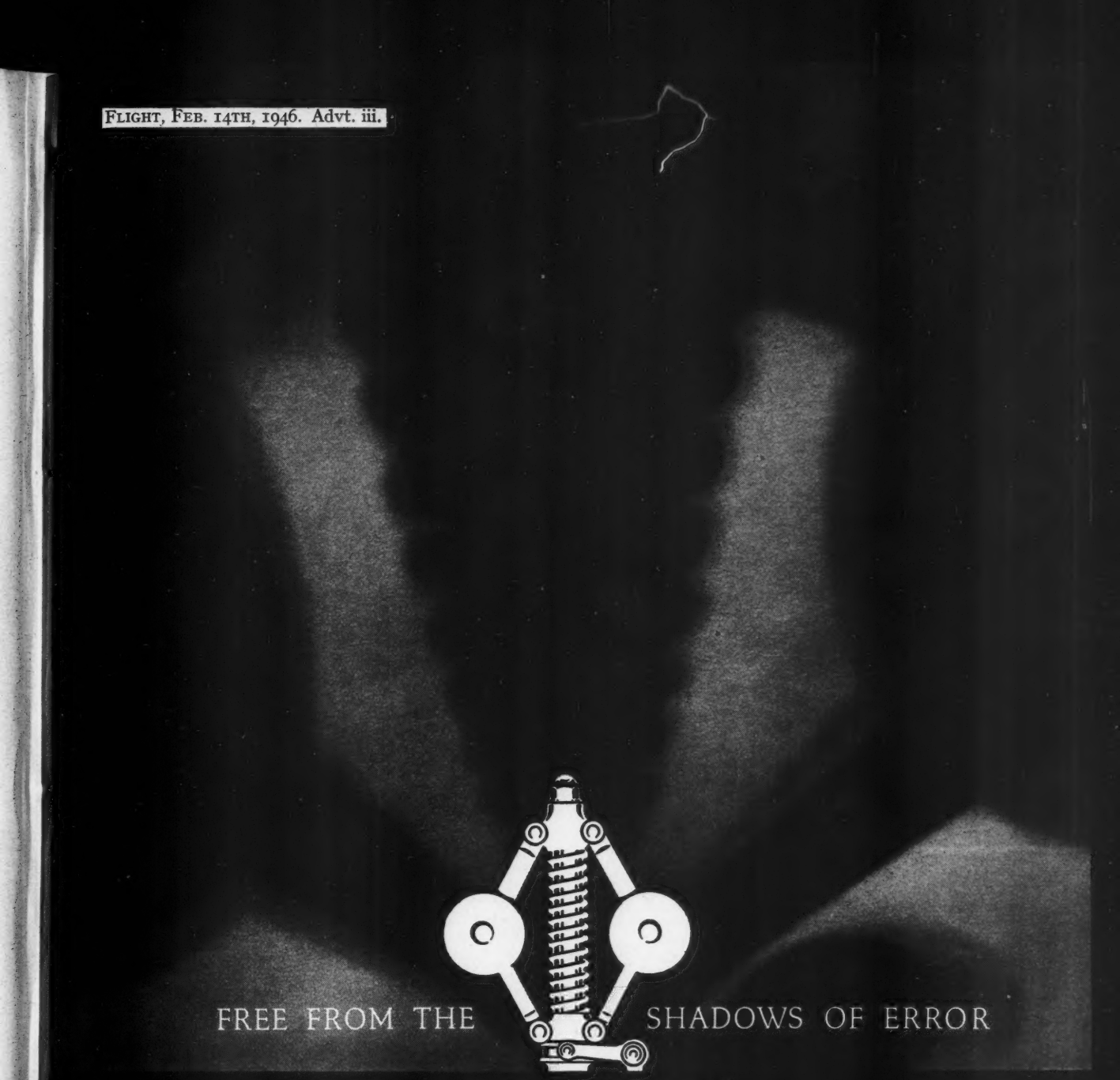
More American West to East records are being smashed every day. The latest is the P-80 flight from Long Beach, California, to LaGuardia Field, New York, in 4 hrs. 13 mins. 26 secs. at an average speed of 584 miles per hour. One does not know what the winds aloft were, but such flights are not generally undertaken unless the average following wind is over 80 m.p.h., and it can often be as much as 150 m.p.h. for parts of the journey. It is high time someone gave an award to the West Wind in recognition of services rendered in establishing records, both on the Continent of North America and over the Atlantic. Actually (and already commented on in a *Flight* leader last week.—Ed.) the impressive part of this particular flight was the endurance of the aircraft and the fact that some of it was made at 40,000 to 41,000 ft. It would be most interesting to know the exact amount of fuel carried (said to be 1,000 gallons) and that used, the height to which the cabin was pressurised, the details of the engine cruising chart, and so on. The extra wing tip tanks were retained during the entire flight as, being above the overcast, the pilot did not dare to jettison them.

An attempt on the world's speed record with this aircraft is to be made some time during March or April at Muroc Lake, but if the P-80 is not found to be satisfactory, it may have to be delayed until the Republic or Vought jet fighters are through their flight tests.

When considering these coast-to-coast records, they should not be dismissed as so much local propaganda. Their effect on foreign markets is probably considerable, particularly in South America, and it is to be hoped that the British will counter with some Empire records of our own, which, because they would cross other nations, might be even more effective if properly publicised.

* * *

Proposals whereby the civil airlines in the States would benefit by development work carried out by the U.S. Army Air Forces, have appeared in the press over here. This would be done through such Air Force Commands as the Air Transport Command and the All-Weather Fying Unit, this latter being under the command of Colonel Ben Kelsey, who was well known in England during the war. It certainly seems an excellent idea that technical and develop-



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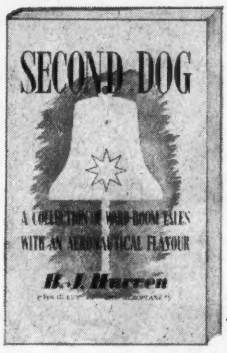

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AMERICAN NEWSLETTER

ment programmes should be co-ordinated between the military and civil authorities, and if, as has been suggested, the U.S.A.A.F. order a limited number of each commercial type so that they may test them under operational conditions, it will not only assist the manufacturer and airline operator in some of the initial development work, but will ensure a sale, however small, and be looked on as a form of Government subsidy to both manufacturer and operator.

With regard to new-type equipment—particularly that relating to bad-weather flying—the proposal that there be close co-operation between the Air Force and the Civil Aeronautics Authority was discussed unofficially during a demonstration of the SCS-51 instrument approach system, which system is receiving a good work-out on the Air Transport Command test run between Miami and Casablanca. The suggestion came from the commander of the Carribbean Wing, and although no official response was received from the C.A.A., there is such obvious merit in any co-operation of this nature that one imagines there would be at least a favourable reaction. What similar steps are being taken in England is not known, but it is hoped that any differences on outlook of design or equipment which might arise between R.A.F.T.C. and, say, B.O.A.C., would be compromised to the common good, and a programme worked out which would help the development of civil aircraft and equipment.

Items from the U.S.

THE permissible all-up weight of the Constellation has been increased to 90,000lb. To be allowed this increase, three-engined take-offs were necessary, and the 50-foot screen was cleared in 3,820 feet.

* * *

Air France is the latest, and apparently one of the biggest, foreign customers to come to the States for its aircraft. Its present and contemplated equipment is said to be 13 Constellations, 15 DC-4s and 25 DC-3s—altogether a sizeable order. One hopes the rumour that Miles Aerovans are to be used for French postal services is true.

* * *

Republics are contemplating a twin-engined five-seater to cruise at 170 m.p.h. The price is expected to be around $7,000, and if this is realised some of the other manufacturers in this size will need to take a second look at their production costs and selling prices. The engines will obviously be Franklins—probably the 210 h.p. model—and production might start in 1947.

* * *

Rumours continue to cloud the fate of the big Consolidated-Vultee six-engined C-99. This Army version is alleged to be on the very point of flying, but what is to happen to the commercial version remains to be seen. The latest story is that it is to have four wheels on each undercarriage leg instead of the present two, and that each pair will be independently sprung. Moreover, there is talk of making it a tractor aircraft instead of a pusher by the fitting of turbine-driven airscrews with extension shafts to the leading edge.

* * *

There is a much greater interest in freight transport in the U.S. than is commonly realised. Henry J. Kaiser is talking of a New York-San Francisco service. United Airlines are also considering a coast-to-coast service, and the National Skyways Freight Corporation has bought some C-47s. This last company's fleet has included some of the Budd freighters—an aircraft that had rather a hectic career when built for the U.S. Navy Air Transport Service, and which was finally turned down for the job for which it was intended. It was considered to be underpowered and had mechanical and aerodynamic faults, most of which could, given time and good development flying, have been cured. Although immediate war requirements prevented any such development programme, some of its features—notably the amount of unobstructed space, the ease of loading, the good cockpit and wonderful view—made it an interesting aircraft.

The disposal of surplus U.S. transport aircraft still continues. Many of these are going to internal domestic airlines, but amongst those sold to foreign countries are two C-54Bs to Brazil, one to Columbia, two to Dodero in Argentine, and one to Mexico. Tata have obtained at least two DC-3s. In addition to these allocations, Panair de Brasil are reported to be negotiating for three Constellations for a Transatlantic Service, and the Brazilian Air Force has purchased a Vultee B-19 trainer, presumably with the idea of purchasing more if they find it suitable.

* * *

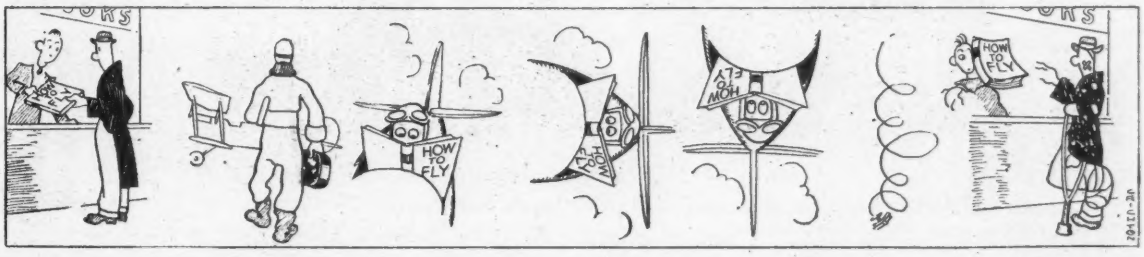
Surplus U.S.A.A.F. transports that are dotted about all over the world are also being disposed of to local air transport interests, and it is reported that 17 C-47s have been sold, ex Manila, to the Netherlands East Indies Government; 5 to Philippine Airlines (in which T.W.A. have a 28 per cent. holding); 4 to Far Eastern Air Transport, Inc.; and 25 to Australia.

* * *

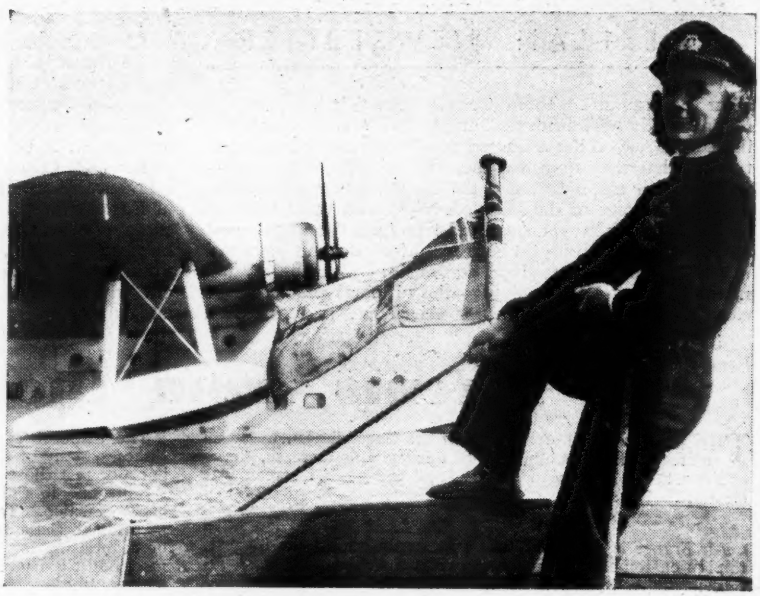
There seems to be a spate of American "records" at the present time. Last week we mentioned the American coast-to-coast record by a P-80. Shortly afterwards, the first scheduled Atlantic crossing by a Pan American Constellation on February 4th was achieved in the excellent flying time of 12 hr. 9 min. from New York to Hurn. The journey was accomplished in three hops: New York to Gander, Newfoundland (1,020 miles); Gander to Shannon, Eire (1,775 miles); and thence to Hurn. The aircraft took 4 hr. 33 min. for the first hop, and, for the second, from Gander to Shannon, only 6 hr. 36 min., a remarkably quick trip. The Constellation carried 29 passengers and about one ton of freight and, making, according to the pilot, full use of its pressurised cabin, flew at 17,000ft. where it had the advantage of favourable winds. When the aircraft arrived at Hurn, it was six minutes ahead of its "scheduled" time of 12 hr. 15 min. for the entire journey. Incidentally, the scheduled time for the Douglas Skymasters on this journey was almost 17 hr.

This was not the first Atlantic crossing by a Constellation, however, for during a survey flight recently, a Pan American aircraft of the same type flew from New York to Lisbon non-stop (3,425 miles) in 9 hr. 58 min. Another record commercial flight, also by a Constellation, was set up on February 3rd in America. A Trans-Continental and Western Airways Constellation flew non-stop from Burbank, California, to the La Guardia airport, New York, in something over seven hours, thus breaking the record previously held by a Boeing Stratoliner of the same concern, and set up in July, 1944, with a time of 11 hr. 55 min.

AIRSTRIP No. 1



CIVIL AVIATION NEWS



AIRLINE EMPLOYMENT

IN order to deal with the very considerable number of enquiries now being received from Service personnel, B.O.A.C. have sensibly produced a "broadsheet" giving details of the various opportunities in the Corporation. This "broadsheet" explains the qualifications required and salaries offered in all the various branches of B.O.A.C., and, in particular, for aircrew personnel including pilots, navigators, radio operators, flight engineers, pursers and flight stewards. For the benefit of prospective enquirers in the aircrew category, it should be said that the minimum qualifications required of a Second Officer are the possession of a "B" licence and the proof of 800 hours of solo flying. The "B" licence may, however, be obtained later.

P.I.C.A.O. PROGRESS

A NUMBER of appointments to the secretariat of the Provisional International Civil Aviation Organisation was announced last week by Dr. Edward Warner, the President of the Interim Council. The only representative of the United Kingdom included was Mr. Francis W. Hancock, who was nominated chief of the Landing Areas and Ground Aids section. Mr. Hancock was in the Aviation Department of the Automobile Association from 1930 to 1935, and then went to the Air Ministry. He became operations officer in the Operational Services and Intelligence Division of the Department of Civil Aviation, and when the Department was reorganised last year as the Ministry of Civil Aviation, he became Deputy Director of Operations Services.

Mr. Edward Motley Weld, of New York, has been appointed acting Assistant Secretary General of the Air Transport Bureau.

The truly international character of the organisation generally is reflected in the fact that a further ten different countries are represented amongst the remaining thirteen senior appointments announced.

Among the more recent technical sub-committees of P.I.C.A.O. to sit are those on accident investigation, personnel licensing, facilitation of international air transport, airline operating practices and airworthiness.

The problem of accident investigation calls for some kind of international standardisation of investigating methods and for international mutual aid in the maintenance of adequate investigation systems. There is also the difficulty of fixing responsibility for accident investigation on international air routes.

We are glad to see that, at the opening meeting of the committee on "facilitation of air transport," both the President of the Interim Council and the Chairman of the Air Transport Committee stressed most strongly the need for obviating delays in passenger handling at places of embarkation and disembarkation, and also at intermediate stopping points where routes cross international borders. Preparation for international flights inevitably involves customs, immigration and public health officials, and passengers and aircraft must be held for the absolute minimum of time, otherwise the great advantage of air travel, namely speed, is lost.

These points are reflected in the agenda for the committee, for, amongst the various items to be considered by them, is the development of recommendations on the extent to which passports, visas, and similar requirements can be simplified or eliminated for non-immigrant business and tourist air travel.

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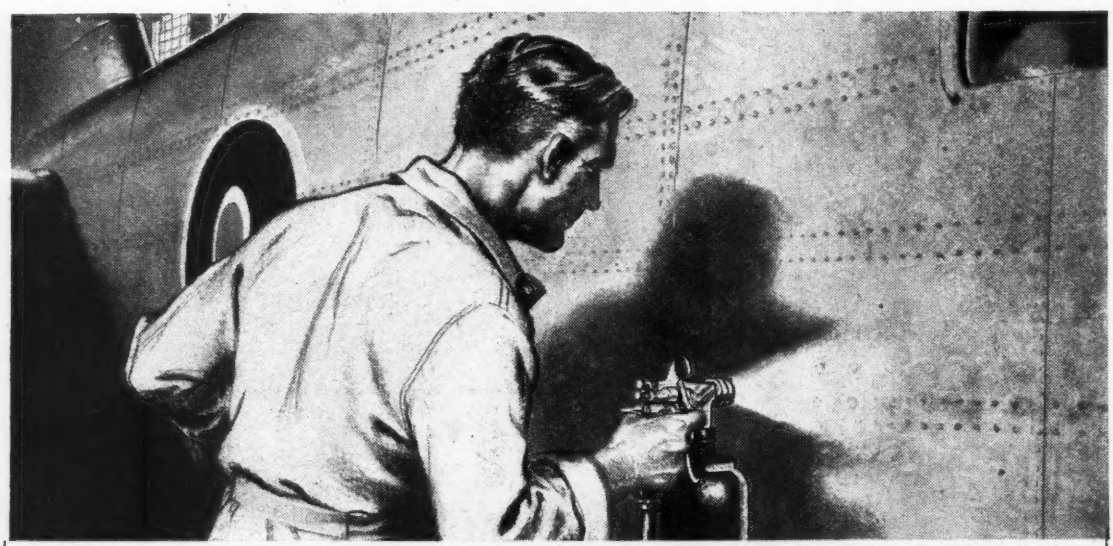

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CIVIL AVIATION NEWS

TRANS-PACIFIC AGREEMENT

IT is reported that Great Britain, Australia, and New Zealand have agreed to hold a conference in New Zealand in March, in order to work together on the establishment of a Trans-Pacific air service. Although Canada is prepared to co-operate, she prefers to remain outside any Empire arrangement and to operate her own service under exclusive Canadian control.

TO INDIA IN EIGHTEEN HOURS

AS an indication of the scheduled speeds which may, in due course, be normal, a recent flight of a B.O.A.C. Lancastrian from Hurn to Karachi and back in three and a half days is worth recording. The outward journey of 4,675 miles was completed in a flying time of 18 hours, with one stop at Lydda. The regular services will not be made over such long stages, but even so the scheduled elapsed time for the service is likely to be in the region of 27 hours.

A.R.B. NOTICES

FIVE new Notices for Licensed Aircraft Engineers have recently been issued by the Air Registration Board—Nos. 2, 6, 7 and 9. The two intermediate numbers, 6 and 7, are of a routine nature and deal with airworthiness requirements. The others are of more general interest since No. 9 deals with the effects of the new Air Navigation (Amendment) Order and the Air Navigation Regulations of 1946, and No. 2 provides for the introduction of two new licences—"O" (Operational) and "M" (Maintenance).

SINGAPORE SUNDERLAND

ON January 31st the through route to Singapore was re-opened when a B.O.A.C. Sunderland left Poole for the Far Eastern base. The service ceased on February 7th, 1942, when Singapore surrendered, but, since October 13th last, B.O.A.C. have been flying as far as Rangoon.

Three services weekly will be operated from Poole to Singapore on Tuesdays, Thursdays and Saturdays. This new service represents one more step in the rebuilding of the pre-war flying-boat route to Australia. The flight to Singapore takes about 116 hr., although the actual flying time is only 57 hr. Stops are made *en route* at Biscarrosse, Augusta (Sicily), Cairo, Habbaniya, Bahrein, Karachi, Calcutta and Rangoon.

SCANDINAVIAN SERVICES

DISCUSSIONS have been opened with the Scandinavian Governments on the regulation of air services between the United Kingdom and their respective countries. A British delegation composed of Mr. W. W. Burkett, of the Ministry of Civil Aviation, Mr. Rodney Gallop, of the Foreign Office, and Mr. John Brancker, of British Overseas Airways Corporation, has already visited Copenhagen and Oslo, where talks have been held with representatives of the Danish and Norwegian Governments. The delegates are also conducting similar talks in Stockholm with the Swedish Government.

The United States has already begun a regular weekly service to Scandinavia. An American Airlines Skymaster inaugurated the service when it arrived in Copenhagen *en route* to Stockholm last week after a non-stop flight from the United States of about 22 hr.

BY SLEEPER TO THE CAPE

THE "luxury York" which has a modified interior built by Air Service Training (described in *Flight*, January 17th) is being used by B.O.A.C. for a survey flight to South Africa, with the dual object of demonstrating the aircraft to South African Airways, and testing the reactions of passengers to a fast long-distance flight with only short stops for refuelling.

At present, the elapsed times for the Springbok service are 70¼ hr. outwards, and a little over 60 hr. homewards, but the scheduled flying time for the Hurn to Johannesburg journey with this York is only 31¼ hr., and the total elapsed time 39¼ hr. Refuelling stops are at Luqa (Malta), Cairo, Khartoum, and Nairobi.

Fourteen sleeping berths provide the passengers with the maximum comfort for night travelling, and, for the purpose of this trial run, the "guinea pigs" are representatives of the B.O.A.C. traffic, technical and medical departments.

In an effort to reduce noise and vibration as much as possible, a synchroscope is fitted to ensure the constant synchronisation of all airscrews, and the cabins have been sound-proofed in such a manner that normal conversation is said to be possible during flight.

SCOTTISH PLANS

THE Ministry of Civil Aviation intends that the corporation entrusted with the operation of internal air services shall provide air ambulance services to serve the Highlands and the islands of Scotland which are served at present by Scottish Airways. Private operators, however, will be at liberty to provide ambulance services on charter if there is any public demand for them.

Incidentally, the institution of a regular normal air service between Edinburgh and London is to be given high priority in the Ministry's schedule of new internal services. No indication has been given of the airfields which will be used, but the Ministry of Civil Aviation has stated that Turnhouse, which is a military airfield, is also to be used, by agreement with the Air Ministry, by scheduled civil air services as soon as the necessary ground organisation is available.

REPLIES IN THE HOUSE

THERE was a series of questions in the House of Commons last week on the subject of airline fares, priorities, frequency of services and availability of aircraft generally. In his replies to these questions, the Parliamentary Secretary to the Ministry of Civil Aviation made the following points:

Airline Fares: It was hoped that all fares for external services would be settled by international agreement and based on economic considerations. Subsidised rate cutting was to be prevented.

Availability of Aircraft: There was very little accommodation for passengers other than Service and official passengers on the Ferry Service across the North Atlantic, and this reinforced the decision to buy five Constellations. The basic price of these aircraft would be 700,000 dollars each, a total of over £850,000. This figure was subject to "certain adjustments," but whether up or down was not made clear. The delivery of the five Constellations was expected to be completed by the end of April, and it was planned to put them into service in July. For the purpose of taking over the 72 Dakotas under Lend-lease, their purchase price had been calculated at the standard United States surplus disposal price of 20,000 dollars each. Replacements and spares for the Ju-52s, which were not new aircraft, would be provided from stocks of Ju. spares already in our possession, and by cannibalising surplus aircraft of this type; also, to a limited extent, by manufacture in this country.

Frequency of Internal Services: Internal schedules now in operation totalled 271 per week, but a reasonably full internal service might be expected by the late summer. (Compared with the pre-war figure as at August 31st, 1939, of 875 services per week, also quoted by Mr. Thomas, this may seem very low, but it must be remembered that a large number of these services were seasonal. At that date, for example, there were 140 services per week from Portsmouth to Ryde, and 182 from Weston-super-Mare to Cardiff, which increased the total figure very considerably.)

Priorities: Because the demand for seats on the B.O.A.C. European services to Paris, Brussels and Amsterdam exceeded the supply, the London Air Priorities Board, for the present, would allow only 50 per cent. of the available seating to be placed at the disposal of B.O.A.C. for commercial traffic. As circumstances permitted the system would be extended to other routes and the number of seats for commercial traffic increased until the need for the priority system disappeared.

CLUB MEETING

A MEETING of the General Council of Associated Light Aeroplane Clubs and representatives of prospective clubs in process of formation will be held at the Royal Aero Club on February 20th.

THE WILTSHIRE CLUB

IT is expected that the Wiltshire School of Flying and Club will be restarting operations in the near future, using the airfield which was their base in pre-war years. This airfield, High Post, has, during the war, been used by Vickers Supermarine for experimental flying and development work and has been considerably improved, as far as the grass runway lengths and conditions are concerned.

The Club will be equipped with Taylorcraft Austers, the rates for which, both dual and solo, will be £3 an hour. Two of the former organisers, Sqn. Ldr. J. Doran-Webb and Sqn. Ldr. M. F. Ogilvie-Forbes, have the plans of the "reformation" in hand at Corner Elm, Netton, Salisbury, Wilts.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

THE P-80's "RECORD"

Assisted by Remarkable Tail Winds

BY the time this message is received in England, there will no doubt have been considerable comment on the rather remarkable trans-continental speed run set up on January 26, by an Army P-80 pursuit.

Having a sincere appreciation of your factual and honest viewpoint maintained in *Flight*, I believe it only proper that information, perhaps not otherwise available, be presented you in regard to this record flight. It is not with a desire to discredit a remarkable achievement that I wish to point out the weather conditions surrounding a new trans-continental record of 4 hours 13 minutes, but only because in all probability they will not be published in this country, and the inference will therefore be drawn, as in the past, that the P-80 is "superior" to all else.

Examination of the C.A.A. weather maps of January 26 discloses a rare and remarkable wind condition. *All* weather stations in the general area of the flight reported wind velocities of not less than 100 m.p.h. at 20,000ft. in the direction of flight. Somewhat unfortunately, only one station reported winds for higher altitudes; this was at Chanute Field, near Chicago, on the direct line of flight. Wind at this station at 30,000ft. was 130 m.p.h., and at 40,000ft., 165 m.p.h.!

As the non-stop flight was made at 30,000ft., changing to 40,000ft. in this vicinity, it is undeniable that the P-80 was aided by tail winds in the neighbourhood of 120-160 m.p.h. throughout the run.

Yours for honest technical information;

CALIFORNIAN.

NATIONALISED AIRWAYS

External Services a Special Case

SINCE the debate on nationalisation is open, I take the liberty of expressing my views on this subject. First, I want to point out that I am not a supporter of the policy which consists in putting all vital industries under the control of the State. In almost all cases the lack of the competition spirit is nothing less than disastrous. But in external airlines things are quite different. There are a lot of competitors to deal with, and the State will be forced to maintain a high standard of comfort, security, etc., to avoid failure. The State will be able to do this as well as could two companies working in rivalry.

Of course, this only applies to external airlines. The nationalisation of internal airlines would lead to the same results (very often not too good!) as the nationalising of industry.

A BELGIAN READER.

IN SEARCH OF SAFETY

Rotor Wings versus 3-mile Runways

I AM extremely pleased to see that in Mr. Goodright (*Flight*, January 24th), I have a supporter in my contention that however fast an aircraft is designed to travel in the upper atmosphere, it must eventually (and the sooner the better) be capable of alighting and taking off vertically at a controllable rate of descent. In fog at sea ships proceed with due caution and, near land, take soundings as they go. Aircraft should be capable of doing likewise.

After more than 2,000 hr. of flying I still think, when making a beam approach, "Hell! my life still depends on the contents of that little black box. Normally it works. What if it didn't suddenly?"

Referring to Heathrow Airport, I can only suggest, as a user of airports, that there would appear only one way of turning this Cretin child of two departments into something approaching a national airport. Roughly, duplicate all runways with a parallel one outside each. Extend No. 3 runway by 750 yd. up to the Great South West Road, and No. 2 1,000 yd. in its s.w. direction, and put all your terminal buildings and maintenance hangars in the centre. These could be reached by subway roads under the main runways, and all the offices and other passenger and executive departments would be concentrated centrally.

One would have to extend the airfield towards the south-west under this scheme, but if only our aircraft manufacturers would produce a safe aircraft, i.e., one that will go up and come down vertically and slowly, then we would not need these extraordinary long, smooth, wide, flat concrete highways stretching into the middle distance. In 1935 we needed approximately 600-800 yd. to land and get off. In 1945 we needed up to 2,000 yd. By 1955 we shall need 6,000 yd. if the present trend continues. Runways over three miles long. It's ludicrous! It's high time that a halt was called and designers thought again.

I am sure that there is only one answer—small wings in flight and large wings for take-off and landing, and it is easier to design a rotor for retraction than to tuck away a normal wing.

P.Y.F.O.

LONG-DISTANCE RECORD

Overload Range of the Lincoln

I HAVE heard frequent comments on the long-distance record and the lack of effort to challenge it. This is, I think, due to the fact that we have no aircraft at the present date to offer any challenge.

I read your excellent article on the Lincoln (Jan. 17th). As far as my knowledge extends I am convinced that this is the greatest load-carrying aircraft we have. Supposing the military load were dispensed with, the basic weight could only be brought down to 45,000 lb. As is customary in a necessity the a.u.w. may be increased to 85,000 lb. This would leave only 40,000 lb. for fuel and oil, giving a range of 5,500 miles, supposing an average of 1 a.m.p.g. Could any of your readers offer any comment on this. I have recollections of an article in a newspaper stating that the Stirling could challenge the record but I know by experience that this is impossible. I am afraid I missed your previous data on the B.29 so I am unable to compare notes.

LEONARD W. F. BROCK,
W/O. Flight Engineer instr.

Of No Value Without Classification

THERE is a matter in connection with the recent world's records which rather puzzles me, and I would be interested if any of your readers could tell me if my reasoning is wrong.

For the speed and height records it is obvious that any aircraft which can obtain the greatest speed or height is the best in either class, but I cannot see where this applies in the long-distance record. The U.S.A. recently captured this with a large 4-engined aircraft, when the previous record had been held with a small single-engined one, and to my mind this proves nothing, as larger machines, given the same crew, etc., will always be able to carry a larger proportion of fuel than a smaller type, and, given engines of near-perfect reliability, the aircraft which can keep its engines supplied with fuel for the longest time will get the range record. (This is just dealing with principles, and ignores factors such as cruising speeds and efficiencies, etc., but if the aircraft were classified, then it would be these factors which would prove themselves.)

My idea is that it would be a better test of worth if aircraft were divided into classes for distance records. I suggest weight/power or number of engines. Then, if the U.S.A. were to win the record with a machine of the same class as the Wellesley, theirs would have proved to be the better machine, and, of course, their engine also.

D. E. POTTER.

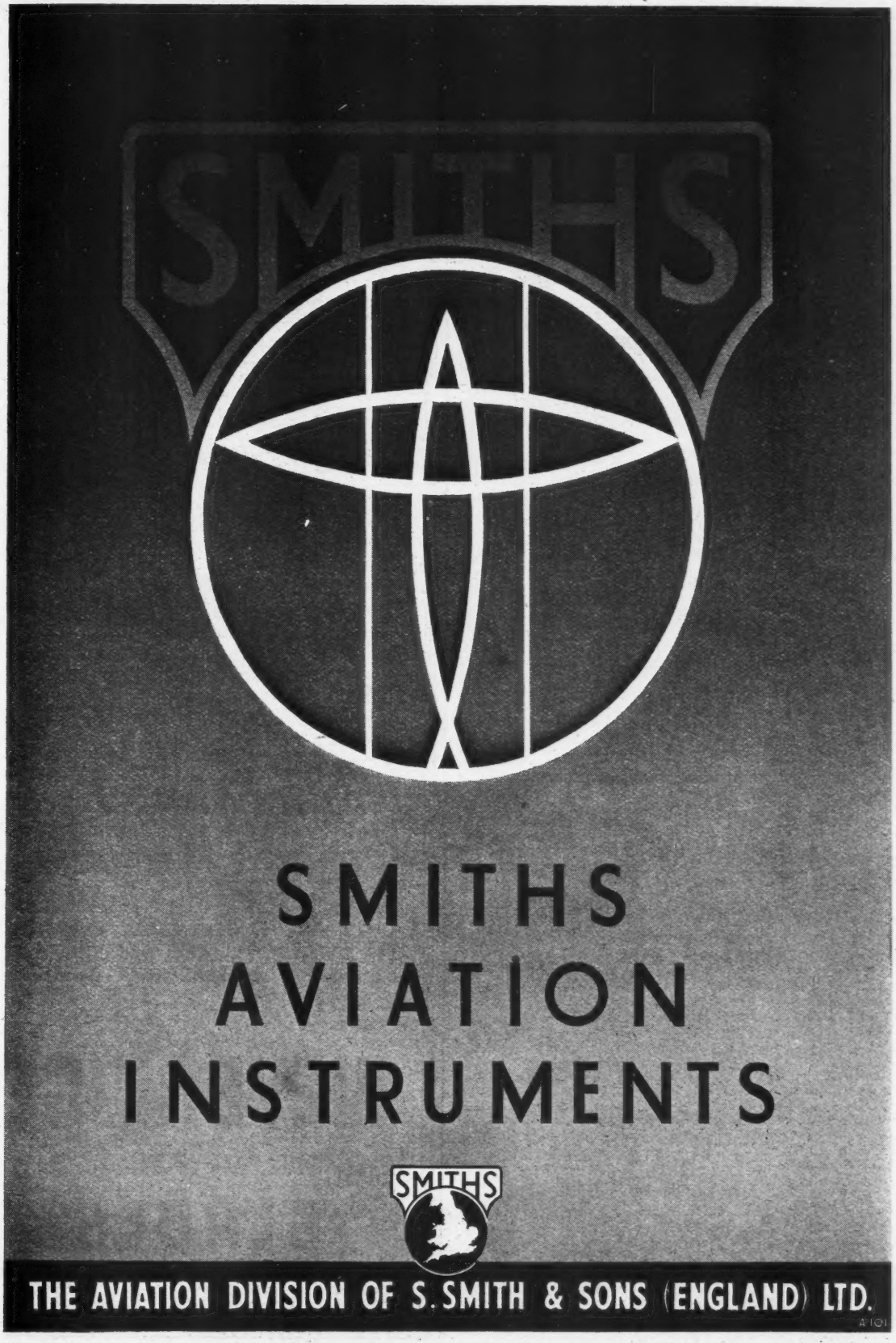
LIGHT AIRCRAFT

Safe Flying Essential

IT is certainly high time, as your correspondent "Impecuniaviator" points out in *Flight* of January 31, to sort out some of the problems which cloud the future of light flying, and since I have had some cause to go into these matters, I should like to put forward my views.

In the first place, there is no ready-made market for light aircraft. *No one really wants to fly;* it is too dangerous, complicated and expensive, and not until the British "light" constructors get together and decide collectively, not competitively, to sell the idea of safe (above all safe), simple and cheap flying will a market be made.

It was just the same in America, and I think we may assume that flying has "caught on" in the U.S.A., because the accent in all advertising of American light aircraft is on the safety of flying. Indeed, one has to look twice to find the name of the advertiser, so insistent is he to put over the safety and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simplicity of flying rather than boost his own particular aircraft. He realises that what brings business for one, brings it for all.

British constructors' advertising is pathetic. No effort is made even to get the ordinary man interested in flying, let alone sell him the idea, but instead a (usually poor) photograph or drawing of an aircraft and the constructor's name, with some whimsically inept remarks about what that advertiser did in the past is hidden in a small space on a back page of one of our technical journals. This palsied effort is based on the quite erroneous assumption that the man in the street is already clamouring to get into the sky, when in actual fact he is far too frightened! Why fly, anyway? It is not very amusing or comfortable, and it can be very boring. The main reason is that it extends the leisure and business hours of those who work by cutting down the unrecreative or unproductive time of travelling.

The value of this cannot be exaggerated, but I have yet to see it mentioned as a reason for buying a small aircraft.

Now to come closer to "Impecuniaviator's" point. To make aircraft cheaply they must be made in quantity, and must, therefore, be sold in quantity. The highest income category which exists in any quantity is the £10-£12 per week one, and this decides the price of our aircraft, which cannot exceed £500-£600 for 2-4 seater machines, having a dry weight of from 800-1501b., and the ability to carry nearly as much again in fuel, oil, passengers and luggage.

In other words, to-morrow's aviator is to-day the owner of a medium-priced 12-16 h.p. car. The joke is that he doesn't know it yet, because no one has told him!

A hundred miles per hour for cruising is the absolute minimum which would make it possible to halve the time for a point-to-point journey now taken by train or car. This cannot be done on less than a 75 h.p. engine in a 2-seater machine, and to-day most firms developing light aircraft designs are calling for a higher performance and a 100 h.p. engine. I think they are wrong in this because it must be made easy for the motorist to take to the air, and there is a world of prejudice, coupled with the fear of the unknown, to be persuaded away, and surely the best way to set about this is to provide him with a safe, simple, cheap-to-buy-and-run machine. 75 h.p. brings him into the 30-40 m.p.g. field, and makes it a proposition, but 100 h.p. increases consumption to 15-20 m.p.g. which is quite another story to Mr. Motorist who knows about such things

Can it be done? Of course. America does it with a labour rate 2½ times our own and working a shorter week. How? Because she sells in quantities and can thus afford improved manufacturing technique, but please note that even their present production forecast figures are by no means mass production, and would never stand the oncosts of such methods if they were adopted with existing quantities. America envisages the need for 400,000 2-seater aircraft by 1955—at home alone. The light aircraft industry in Great Britain could be a major industry in ten years' time provided we get cracking *now* and don't let America take all our foreign and Colonial markets, from whence, incidentally, our quantities will come, since the need and usage of light aircraft in England itself can only be but a fraction of the American figure.

Recently our representative returned from South Africa—he stated the sales prospects there were, at the moment, 100 machines per annum! Obviously, the need is far greater, but no one knows, for they've not been told just why they need an aircraft and what it means to own and fly one.

Rest assured, the Americans will tell them, and book the orders.

I say, positively, that no British manufacturer or the Government department responsible is taking any active steps to ensure that foreign and Colonial markets are made and supplied. To develop vigorously world markets with anything British which *flies* is the surest and quickest way to pave the way for all other types of British quality goods the world over. Are these things realised? I say—only by America.

The solution to "Impecuniaviator's" engine problem is not far away. The reticent British engineer shrinks from advanced publicity about something only partly accomplished, but I can promise him the answer to his problem is well on the way, and may even be fact by the time these words are in print. The engine in question features low horse-power, low specific weight (lower than his figure anyway), compactness, up-to-the-minute design, simplicity, requires minimum of service at only very long intervals, and costs far, far less than any other British engine available to-day.

Yes, "Impecuniaviator," Britain *can* step in—but will she? Only by a fully co-ordinated, non-competitive, fully sponsored initial effort can she hope to lay now the foundations for her future supremacy in world markets.

P. R. MONKHOUSE.

Monaco Motor & Engineering Co., Ltd.

FOR THE BOOKSHELF

"Airman's Song Book." Edited by C. H. Ward-Jackson. 21s. Sylvan Press, 24-25, Museum Street, London, W.C.1.

ANYBODY picking up *Airman's Song Book* and knowing it to be a chronologically arranged anthology might hope to find in it some answer to the multiple questions of why people fly, why they must burst into song at parties, and whether the airframe driver has changed his attitude during the last quarter of a century or so. Perhaps there are no answers—and he certainly hasn't changed much. Though more directly cynical than any songs which might be sung to-day, the very first one in the anthology typifies the normal attitude—yet it was sung thirty-four years ago and appeared in print, I believe, for the first time in *War Birds:*

"The bold aviator was dying
And as 'neath the wreckage he lay,
To the sobbing mechanics about him
These last parting words he did say:

"Take the cylinder out of my kidneys,
The connecting rod out of my brain,
From the small of my back take the crankshaft,
And assemble the en-gyne again."

Mess sing-songs have always been very serious affairs, during which old favourites are "sung with extraordinary solemnity by young men holding their cans of beer like oblations or ritual sacrifices," and it would need a good deal more than the space available for a review if an attempt was to be made to explain it all. The attitude exemplified in nearly all Service songs, obscene or otherwise, seems to be merely an amplification of the cynical attitude towards life and death to be expected of nearly everyone in an "industrialised revolutionary" civilisation after its first operational century. I offer the study to the psychologists.

Airman's Song Book is, in its way, a tremendous work. No doubt other people have collected odds and ends of such songs from time to time, but I do not imagine that there has been anything so complete until this book appeared. I don't suggest that every station should have half a dozen copies—because such songs cannot be sung "from the book"—but it might be bought on the quiet so that the selected cheerleaders could study it prior to parties. And it will certainly be exciting to anyone who has spent a few years in R.A.F. messes.

I searched in vain for one particular song—that about "Squadron Leaders and Wing Commanders and Group Captains, too . . . stealing the pay of the poor AC/2. . . ." Maybe there is no "smooth" version of it. H. A. T.

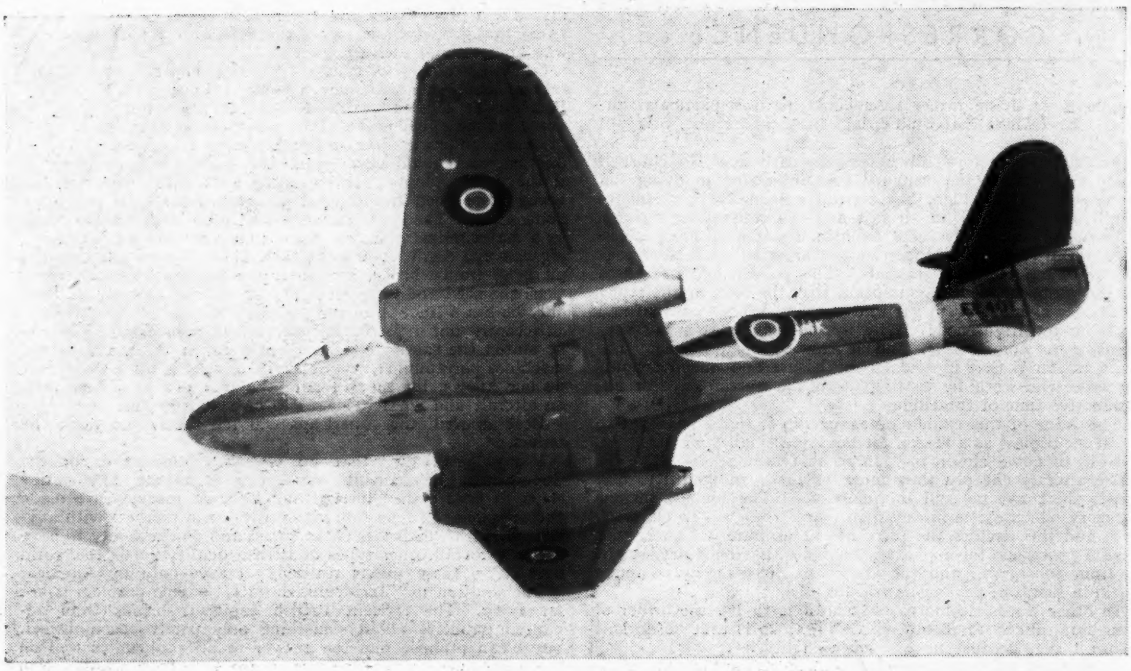
Why? By Paul W. Litchfield and Hugh Allen. The Corday and Gross Co., Cleveland, Ohio. $1.50.

WHY has America no rigid airships? This is the question which Mr. Litchfield asks. He claims that the United States ought to have every form of transport over sea, steamers, and aircraft heavier than air and lighter than air. He says that there is work for all of them. What is more, America can have a monopoly of airship transport, as she has a monopoly of helium gas.

Recounting the history of rigids, Mr. Litchfield fully makes out his case that the various disasters which have overtaken these craft have all been due to faulty construction or faulty handling; except in the case of the Hindenburg, when the disaster was due to the use of hydrogen. He does not deal with the case of the R 100, which was caught in a violent upcurrent over the St. Lawrence. There was no disaster; but passengers would not enjoy that sort of experience, and the damage to the fabric on one of the control surfaces showed that experiments are still needed in this detail.

Everyone admits that travel in an airship is most comfortable; but modern flying boats and landplanes of large size also give a high degree of comfort, and in speed they leave the airship far behind.

The U.S. Navy still uses non-rigid blimps for reconnaissance, and there still seems an opening for naval rigids which carry wheel-less landplanes in scouting for enemy commerce-raiders over the wide oceans. F. A. de V. R.



STAR TURN: A Gloster Meteor III, the only Allied jet aircraft to see action. Its main external difference from the record-breaking Meteor IV lies in the shorter jet nacelles, although some Meteor IIIs have been modified to resemble the Mark IV.

SERVICE AVIATION

Royal Air Force and Naval Air Arm News and Announcements

Awards

Royal Air Force

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Distinguished Service Order

Wing Cdr. R. A. GORDON, D.F.C., R.C.A.F., No. 436 (R.C.A.F.) Sqn.—In directing the operations of his squadron, Wing Cdr. Gordon has displayed exceptional ability as a leader During the Burma campaign he organised and maintained weather observation aircraft which proved of the greatest assistance to the Transport services throughout the monsoon period. Wing Cdr. Gordon frequently took part in these flights, which were of a most difficult and hazardous nature. This officer has also taken part in a large number of operational missions with Coastal Command. In the course of these he completed many successful sorties against enemy shipping. On many occasions his aircraft has sustained damage from the enemy's defences. Wing Cdr. Gordon has invariably displayed the most outstanding courage and devotion to duty.

Bar to Distinguished Flying Cross

Act. Wing Cdr. R. N. H. COURTNEY, D.F.C., R.A.F.O. H.Q. No. 906 Wing.
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F/O. H. A. LITHERLAND, D.F.C., R.A.F.V.R., No. 50 Sqn.*
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Act. Sqn. Ldr. G. O. L. DYKE, R.A.F.V.R., No. 45 Sqn.

* Since deceased.

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P/O. L. A. WILLIAMS, R.A.A.F., No. 692 Sqn.
W/O. C. F. CAMPBELL, R.A.A.F., No. 149 Sqn.
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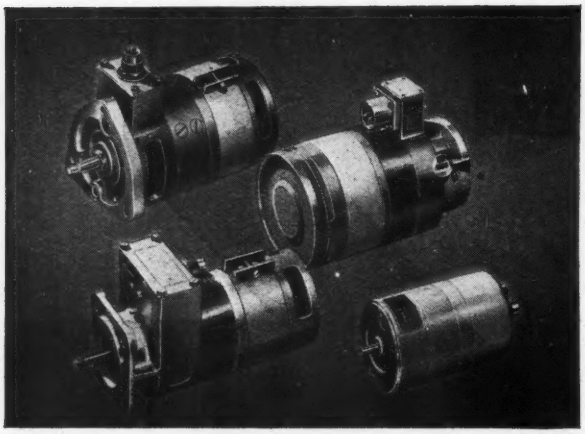

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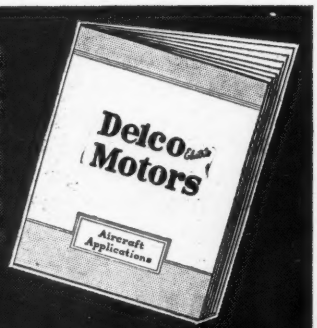

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Sqn. Ldr. T. W. WATSON, R.C.A.F., No. 159 Sqn
Flt. Lt. B. G. HEWSON, R.C.A.F., No. 357 Sqn.
W/O. D. THOMAS, R.A.F.V.R., No. 209 Sqn.
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Act. Sqn. Ldr. B. F G. DARBY, R.A.F.V.R., No 87 Sqn.
Act. Sqn. Ldr. R. S. DON, R.A.F.V.R., No. 142 Sqn.
Act. Sqn. Ldr. D. F. REDRUP, R.A.F.V.R., No. 8 Sqn.
Flt. Lt. F. F. H. CHARLTON, R.A.F.V.R., No. 8 Sqn.
Flt. Lt. L. R. DAVIDSON, R.A.F.V.R., No. 160 Sqn.
Flt. Lt. J. K. HASELDEN, R.A.F.V.R., H.Q.
Flt Lt. J. E. SHANNON, R.A.F.V.R., No. 166 Sqn.
F/O. W. DOBBIE, R.A.F.V.R., No. 160 Sqn.
F/O. J. M. WILLIAMS, R.A.F.V.R., No. 28 Sqn

P/O. A. L. BRIAND, R.A.F.V.R., No. 145 Sqn Sqn.
P/O. C. W. WAY, R.A.F.V.R., No. 420 (R.C.A.F.) Sqn.
P/O. A. F. EMERY, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Act. Sqn. Ldr. J. F. LEEPER, R.C.A.F., No. 160 Sqn.
Flt. Lt. H. W. HARRISON, R.C.A.F., No. 8 Sqn.
Flt. Lt. W. L. SCHROEDER R.C.A.F., No 160 Sqn.
F/O. W. R. HICKMAN, R.C.A F, No. 8 Sqn.
F/O. B. KOOYMAN, R.C.A F., No. 160 Sqn.
F/O. S. D. TURNER, R.C.A.F., No. 160 Sqn.
F/O. L. N. WHITTEN, R.C.A.F., No 160 Sqn.
Flt. Lt. W. L. MILLER, R.N.Z.A.F., No 488 (R.N.Z.A F) Sqn.

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Distinguished Flying Medal

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Sgt. (now W/O.) E. B. LASCELLES, R.A F.V.R., No. 269 Sqn
Flt. Sgt. (now W/O.) J. BAILEY, R.A.F.V.R., No. 61 Sqn.
Flt. Sgt. C. H. CANNON, R.A F.V R., No. 101 Sqn.*
Flt. Sgt. (now W/O.) C. J COLLINGWOOD, R.A.F.V.R., No. 61 Sqn.
Flt. Sgt. S. J. HALL, R.A.F.V.R., No. 83 Sqn.*
Flt. Sgt. D. E. HARRISON, R.A F.V.R., No. 7 Sqn.*
Flt. Sgt. (later P/O.) D. E. D. HARVEY, R.A.F.V.R., No. 97 Sqn.*
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Sgt. J. A. GOODALL, R.A.F.V.R., No. 101 Sqn.*

R.A.F. WAR COMMANDERS

Air Chief Marshal Sir Guy Garrod

(Caricature portrait by Hayden)

AIR CHIEF MARSHAL SIR GUY GARROD, K.C.B., O.B.E., M.C., D.F.C., has been appointed to the Military Staff Committee of the United Nations Organisation. In recent years he has been Deputy A.O.C.-in-C., India, then Deputy Allied Air C.-in-C., South-East Asia, and from November, 1944, to February, 1945, Acting Allied Air C.-in-C., South-East Asia. In 1945 he was A.O.C.-in-C., R.A.F., Mediterranean and Middle East. This makes a long list of very important posts.

Born in 1891, Sir Guy was educated at Bradfield College and University College, Oxford. Both at school and at Oxford he held scholarships. In August, 1914, he was commissioned in the Leicestershire Regiment, and went to France with it. In February, 1915, he was awarded the Military Cross. Before the end of that year he was seconded to the Royal Flying Corps, and rose to command a wing. After the Armistice he was awarded the Distinguished Flying Cross.

In 1921 he took a course at the Royal Naval Staff College, Greenwich. In 1923 he became an instructor at the R.A.F. Staff College, Andover. Finally, in 1933 he completed his military education with a course at the Imperial Defence College. He also qualified at C.F.S. as a flying instructor.

Not the least important of the appointments he has held was that of Chief Instructor of the Oxford University Air Squadron. For some recondite reason there were comparatively few Oxford men holding the rank of Wing Commander in the R.A.F. at that time, and the squadron was pleased to have a member of the University as its Chief Instructor. The squadron took a more prominent place than before in Oxford life during Sir Guy's tenure of this post. Some of his more important work during the late wars against Germany and Japan have been mentioned above. His appointment to the Military Staff Committee of U.N.O. is a testimony to his capacity and to the high opinion held of him by Service authorities.

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Flt. Sgt. I. DONOVAN, R.C.A.F., No. 101 Sqn.
Flt. Sgt. J. S. HOSIER, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Flt. Sgt. W. C. NAPIER, R.A.A.F., No. 101 Sqn.
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Flt. Sgt. C. D. B. ESCOTT, R.A.F.V.R., No. 35 Sqn.
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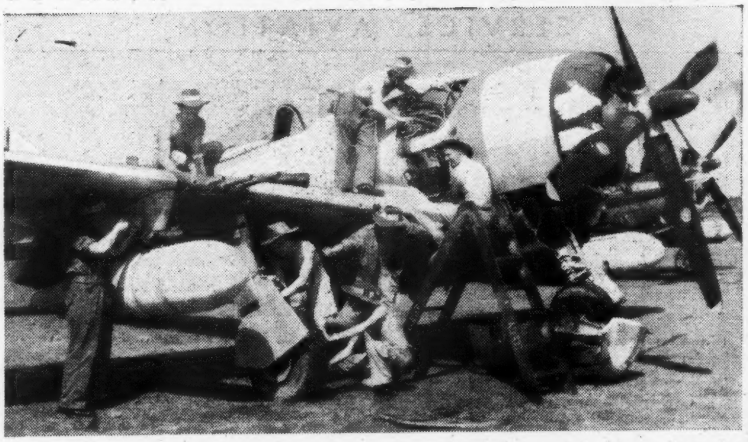
Flt. Sgt. F. R. WILDS, R.A.F.V.R., No. 156 Sqn.
Flt. Sgt. J. H. WILSON, R.A.F.V.R., No. 102 Sqn

* Since deceased.



Seven R.A.F. ground crew (all of whom are Liverpool men) preparing a Thunderbolt for operations in Surabaya.

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Act. Flt. Sgt. G. E. ARMSTRONG, R.A.F.V.R., No. 7 Sqn.
Act. Flt. Sgt. K. LEIGH, R.A.F.V.R., No. 109 Sqn.
Act. Flt. Sgt. E. V. TAYLOR, R.A.F.V.R., No. 156 Sqn.
Act. Flt. Sgt. G. TUNGATE, R.A.F.V.R., No. 582 Sqn.
Sgt. G. A. BANCROFT, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
Sgt. A. D. BERNOT, R.A.F.V.R., No. 582 Sqn.
Sgt. S. S. H. FORTUNE, R.A.F.V.R., No. 635 Sqn.
Sgt. S. B. GLASPER, R.A.F.V.R., No. 156 Sqn.
Sgt. D. C. MORTIMER, R.A.F.V.R., No. 582 Sqn.

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Flt. Lt. A. J. PAYN, R.A.F.
Flt. Lt. A. L. E. SIMON, R.A.F.V.R.
F/O. H. R. C. WILSON, R.A.F.V.R., H.Q. Base Air Forces, S.E.A.
P/O. P. G. JONES, R.A.F.V.R., No. 22 Sqn.
Flt/O. S. A. STURROCK, W.A.A.F.
Act. Flt/O. O. Y. BASEDEN, W.A.A.F.

Military Cross

Act. Flt. Lt. W. R. JAY, R.A.F.V.R.
F/O. J. F. RINGER, R.A.F.V.R.

Military Medal

Cpl. R. R. HOPE, R.A.F.V.R.
L.A/C. H. ADAIR, R.A.F.V.R.

Army Air Corps

THE KING has been graciously pleased to approve the following award in recognition of gallant and distinguished services in the field:—

Military Cross

Capt. (temp.) F. J. FOWLES, The Parachute Regt., Army Air Corps.

THE KING has been graciously pleased to confer the following awards upon officers of the Territorial Army:—

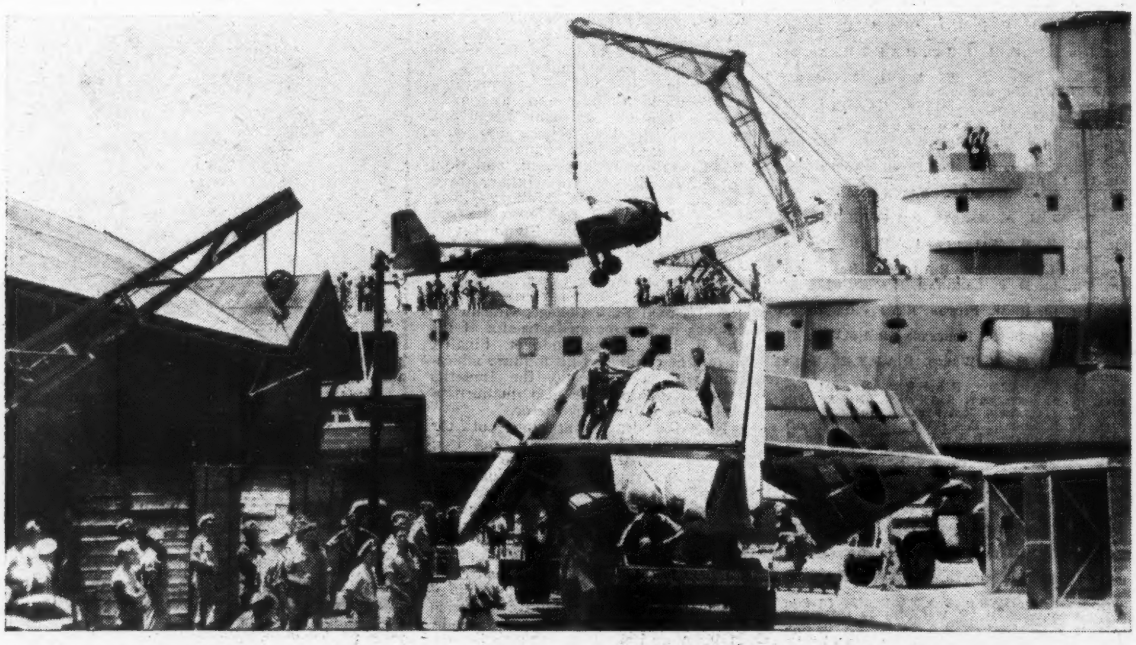
Efficiency Decoration

Maj. G. WIDDOWSON, The Parachute Regt., Army Air Corps.
Capt. (temp. Maj.) G. PAYNE, The Parachute Regt., Army Air Corps.

Official Corrections

Casualty Communiqué No. 562.

R.C.A.F.—Under MISSING, change heading to MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE. For Sgt. F. T. Gidilevich read Flt. Sgt. F. T. Gidilevich.



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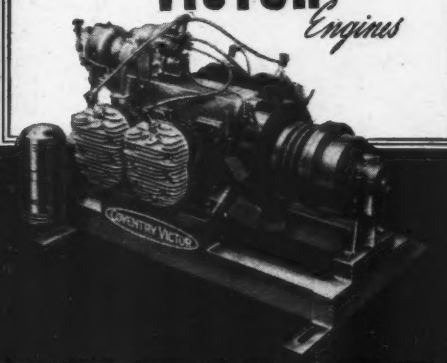

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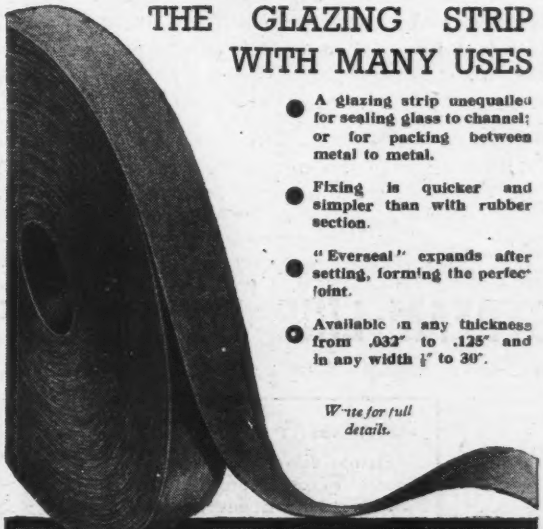

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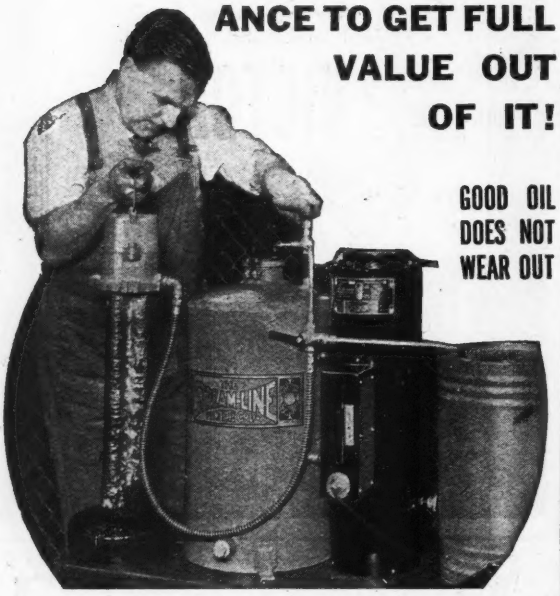

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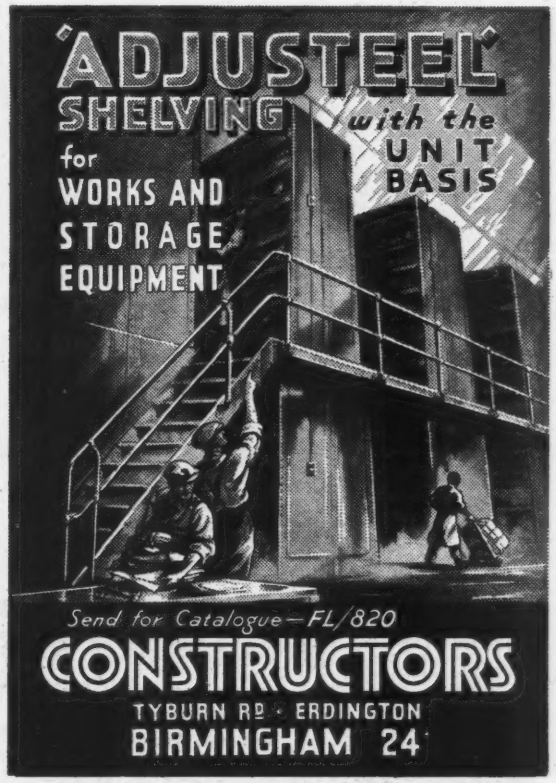

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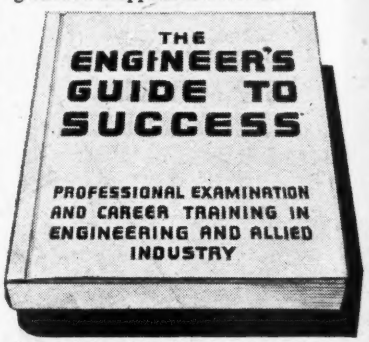

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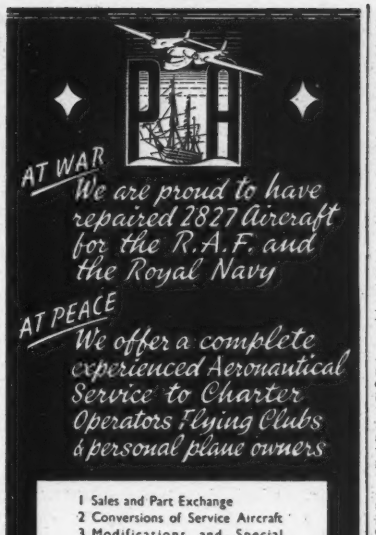
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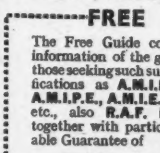

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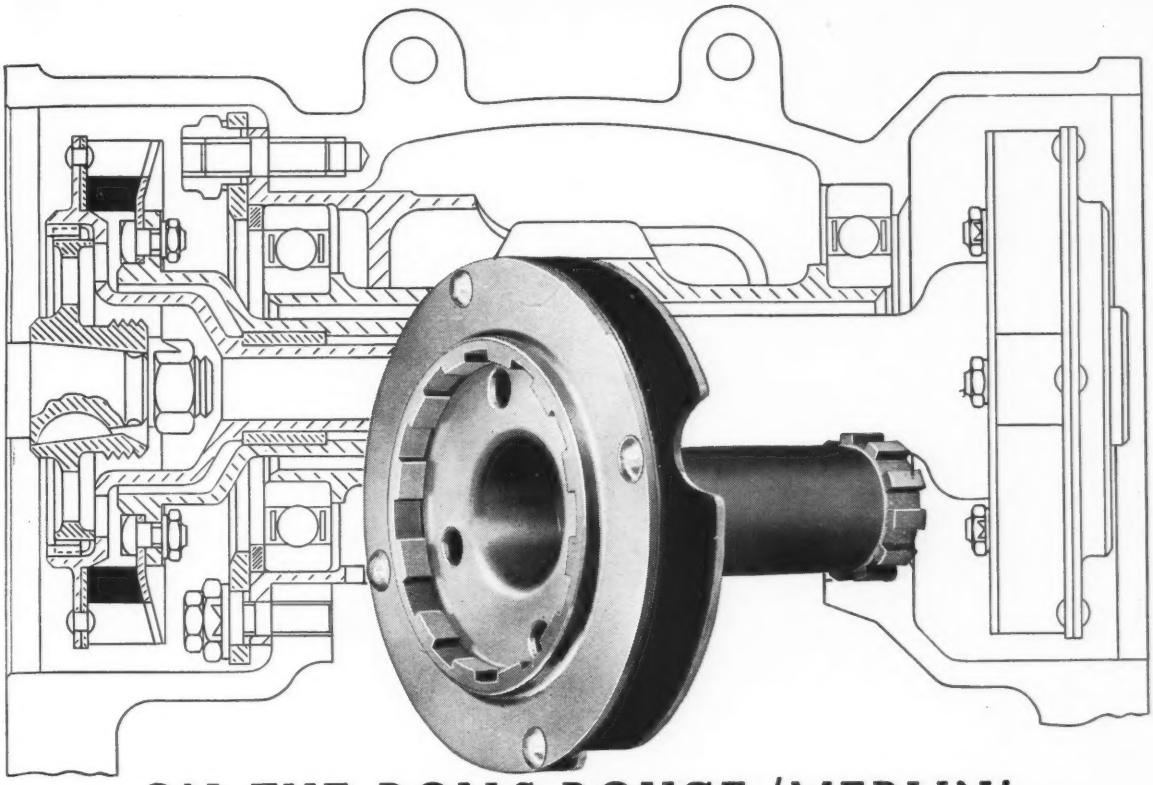

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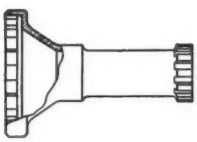

The small line drawing to the left shows the magneto drive as originally planned with a quill drive from the middle of the skew-gear shaft. However, with the increasing vigour of the engine it was found advisable to re-design this coupling to give some torsional cushioning. The photograph in the foreground and the line drawing in the background show the new design with its Metalastik V section coupling. This compact coupling, designed to fit into the existing space, has effectively solved the problem and we have supplied over 100,000 for this famous engine, in addition to couplings and mountings for other situations.

Metalastik couplings generally effect a complete cure for resonance or backlash troubles in gearing, and are used in various applications from those handling fractional powers up to heavy torques.

Metalastik Ltd., Leicester.

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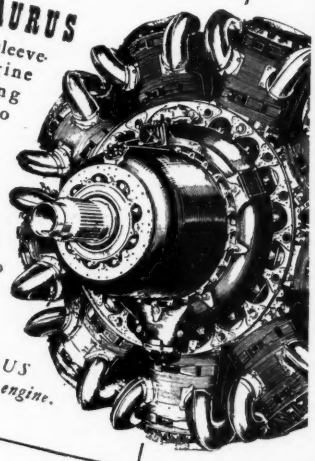

Illustration shows: the CENTAURUS 18-cyl. sleeve-valve engine.

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. . pioneered and developed the single sleeve-valve principle

THE BRISTOL AEROPLANE COMPANY LIMITED

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